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AGRICULTURAL RESEARCH INSTITUTE
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THE VETERINARY JOURNAL.

A Monthly Review of Veterinary Science.

Editor:

FREDERICK HOBDAY, C.M.G., F.R.C.V.S., F.R.S.E.

HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING
OFFICIER DU MERITE AGRICOLE (FRANCE).
CAVALIERE DEI S. S. MAURIZIO E. LAZZARO (ITALY).
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Sub-Editor:

GLADSTONE MAYALL, M.R.C.V.S.

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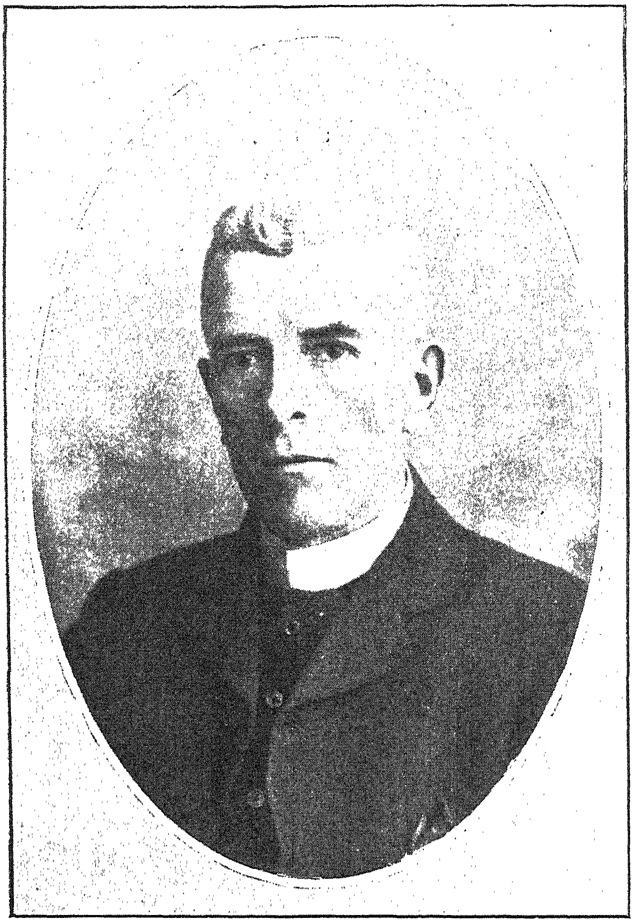

THE LATE MR. E. WALLIS HOARE, F.R.C.V.S.,
Lecturer on Veterinary Hygiene, University of Cork; Hon. Member of the American Veterinary Medical Association; late Examiner to the Royal College of Veterinary Surgeons.

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JANUARY, 1921.

MR. E. WALLIS HOARE, F.R.C.V.S.

It is with great regret that we note the death of Mr. E. Wallis Hoare, as thereby the veterinary profession has lost one of its most enthusiastic workers and one whose every thought was for its upward progress.

Graduating at the New Veterinary College, Edinburgh, in 1886, he became a Fellow in 1892 and occupied the position of Examiner to the Royal College of Veterinary Surgeons from 1901 to 1910. Previous to obtaining the British Diploma he had studied Veterinary Medicine in the McGill University, Montreal, and the American Veterinary Medical Association subsequently did him the rare honour of election as an Honorary Member. A keen and observant correspondent on all matters of clinical interest, and a very busy practitioner, it was simply astonishing how he found time to do all he did; and it is to be feared that the tax he imposed upon himself had a great deal to do with his early death. To most men, to be the possessor of one of the finest and largest veterinary practices in Ireland, with a model Infirmary carried out on modern and up-to-date lines, would have been sufficient; but to Wallis Hoare this was only the starting point and just something with which to fill in the day. For his recreation he still took up veterinary work and devoted his spare time to literature and the teaching of the student. His work in the latter direction was recognised by his appointment to a Lectureship in University College, Cork, and to the positions respectively of Examiner in Class B to the Royal College of Veterinary Surgeons and of Veterinary Toxicology, Jurisprudence, and Sanitary Law in the University of Liverpool.

Of his writings, the third edition of *Veterinary Therapeutics* and his *System of Veterinary Medicine* will remain for some time to come as standard works, and as if that was not sufficient, he held for some time the editorship of a weekly paper, the *Veterinary News*. His opinion as a Consultant was much sought after by his brother practitioners, and in the witness-box his evidence was frequently seasoned with true Irish wit.

On the subject of the use of anæsthetics in veterinary practice he was an authority, and to the study of this he had devoted much time and money; the adoption of the Junker principle of the administration of chloroform vapour to horses being one of his particular studies.

With the true Irish temperament of love of an argument, he was always ready to enter the lists in the correspondence columns of our papers, and it was "woe betide" a correspondent who left a weak spot in his armour, for Wallis Hoare was sure to find it—to the eventual mutual benefit of the writers and the profession.

Sound and earnest in his principles, and always working for the good of his profession and the cause of humanity in animals, his death leaves a blank which will be hard to fill; and for hard, honest, work his life has been an example which our younger members of the present generation will do well to imitate.

Editorials.

THE VALUE OF CLINICAL REPORTS TO THE PRACTITIONER.

In commencing another year of Editorial work we feel that we are justified in drawing the attention of our readers to the great value to the student and practitioner of clinical reports, as it is largely by reference to these that exchanges of ideas are made and encouragement is given to make attempts at progress. THE VETERINARY JOURNAL can claim to be the oldest existing veterinary periodical, having been founded in 1875, with the late Mr. George Fleming, F.R.G.S. (then Veterinary Surgeon to the Royal Engineers) as the first Editor, the contributor to its first page, curiously enough, being the late Mr. Wm. Hunting. Mr. Hunting's first article was on a clinical subject: "The Increase and Prevention of Glanders," a subject upon which he became perhaps the greatest clinical authority, and his concluding remarks were an enquiry as to whether the public were aware that this disease was increasing gradually and surely every year.

His "clinical" was the forerunner to thousands of others, and for clear observations on cases occurring in actual practice there is no series more valuable for either student or practitioner to peruse than the bound volumes of THE VETERINARY JOURNAL.

Not only do English veterinary practitioners contribute, but the clinical columns of all the European and American veterinary periodicals are carefully searched to see that nothing of interest shall escape the notice of the profession in Great Britain. As proof of that one has only to read over in our last issue the indexing of the articles written in 1920, this index occupying a space of some 19 pages; every head line denoting a case of interest to the practitioner. Our present number, too, is rich in clinicals, and that this side of veterinary science is especially catered for is obvious. As this has been appreciated in the past we ask our readers and correspondents to help to make it doubly so in the future. Original contributions of actual facts as they are met with in daily practice are the backbone of the reading for the successful practitioner; and, after all, it was in order to endeavour to become this that he worked for and obtained his diploma and entered upon his life's career.

SALARIES AND ALLOWANCES IN THE INDIAN SERVICE.

IN our last two numbers we have ventilated some of the grievances of our *confrères* in the Indian Civil Veterinary Service and the Royal Army Veterinary Corps respectively, and as a further proof by which to verify them we publish on another page an abstract from the *Journal of the United Services Institution of India*, which shows that other branches of the Services in India also have complaints to make. They cannot all be groundless, and we of the civil element wish our *confrères* well in their efforts to obtain amelioration and to have their difficulties met fairly and adjusted.

To our young graduates, again, until these are put straight, we are bound to again utter a warning that they shall thoroughly consider all the *pros* and *cons* (and especially the future years) before committing themselves to the spending of their lives in any special Department, whether Government or Municipal. The prospects, when a man is middle-aged and has a family to educate and bring up, must be looked to, especially in these days when the professional classes have such keen competition financially with the manual labourer. Otherwise, "genteel poverty" may be the only future to be looked forward to as the accompaniment of a worrying old age.

RECOGNITION TO WHOM RECOGNITION IS DUE.

MANY men do good work but all do not get credit for what they do, and this truism exists in science as well as in other things.

Veterinary scientific workers, too, have not always got their well-deserved rights and in a small profession like ours we cannot afford to miss anything. It is therefore with pleasure that we give space to publish in a further column of this month's issue an article by a well-known resident of South Africa praising the work of Colonel H. Watkins-Pitchford, C.M.G., F.R.C.V.S., the late Bacteriologist to the Natal Government and formerly Principal Veterinary Officer for Natal, who is stated to have "done more for Natal and South Africa in the matter of scientific work in connection with stock diseases than any scientist who has ever been in South Africa." The finding, too, of the "Select Committee of Senators of the Union Government of South Africa to consider the spread and repression of the disease East Coast Fever," confirmed by Sir Arnold Theiler, after elaborate experiments at the Government Laboratory, was that "the Pitchford theory" was correct. Why then was it not adopted? And the reward to the veterinary scientist who saved South Africa millions of cattle and millions of pounds was what? For the answer we refer our readers to our columns.

THE PLIGHT OF VETERINARY SURGEONS.

To the Editor of THE VETERINARY JOURNAL.

SIR,—An excerpt of a note headed "The Plight of Veterinary Surgeons," which appeared in your issue of December 8, has been sent to me. The note, couched in very general terms, suggests a number of questions, among which are the following. Has the writer of the note consulted statistics respecting the horse population in all parts of the United Kingdom? Does he realise that the professional work of the veterinary surgeon of to-day is not limited to the treatment of diseases of horses? Has he compared the total value of the live-stock of the country to-day with that of, say, twenty years ago? Does he know the number of veterinary surgeons holding public appointments at home and abroad? And can he compare the present number with the number in any previous year he may care to select? Can he name a town of any size in which small-animal practice is "a sphere of unstable demand and of negligible value" when the practitioner chooses to specialise? Is the percentage of veterinary surgeons who relinquish their profession and seek other occupations greater than that of, say, medical men who act similarly.—I am, Sir, yours truly,

O. CHARNOCK BRADLEY.

Royal (Dick) Veterinary College, Edinburgh.
December 20, 1920.

General Articles.

SUGGESTIONS FOR IMPROVING CONDITIONS OF SERVICE IN THE INDIAN ARMY.*

By LIEUT.-COL. C. R. SCOTT-ELLIOT,
Commanding 1/61st K. G. O. Pioneers.

1. *Followers.* (Speaking of Regimental followers only). Bhisties, Cooks and Sweepers.—These are extremely difficult to get owing to the totally inadequate pay they receive. Their pay should be raised, and they should be eligible for Good Conduct Pay and Pensions. They should also be attested and *not* only enrolled.

2. *Rank and File.*—The pay is insufficient to attract the best recruits from the labour markets in spite of free rations—the civil labourer can earn anything from twelve annas upwards a day—the sepoys' pay works out to a fraction over 5½ annas a day; and I presume the cost of his rations may be considered four annas, as that is what he is allowed per diem if he does not draw rations—this brings it up to 9½ annas a day; the issue of the present bonus of Rs. 24 for every six months' service apparently recognises that the present pay is insufficient. I consider the sepoys' pay and that of non-commissioned officers should be raised by Rs. 4 a month and the bonus abolished. The extra payment of Rs. 4 monthly would be much more appreciated than having to wait until it had accumulated for six months.

(*b*) They should be entitled to free rations or an allowance in lieu for periods they are on leave or furlough; an allowance in lieu would be simpler, as it would be difficult to ration them in their villages.

3. *Barracks.*—These have improved considerably in the last twenty years and are a great improvement on the mud huts that used to exist. Greater improvement, however, is necessary in the way of structure, especially in the roofing and flooring. A recreation room and school, with necessary furniture, should be provided. An Indian Officers' "Club" in Indian Lines has been sanctioned. Charpoys or beds should be provided for all Indian Ranks at Government expense. Barracks should also be lighted free by Government; at present the sepoy has to pay for lamps and oil.

6. *British Officers.* (*a*) Provision of sufficient and better quarters in cantonments.

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* Abstract from an article in the July, 1920, Edition of the *Journal of the United Service Institution of India.* This illustrates the fact that other branches of the Service in India, like the Indian Civil Veterinary Department, are not contented with the present condition of affairs.—[ED., VET. JNL.]

(*b*) All Officers travelling on leave to be entitled to Form E, and their families on these occasions to travel first-class on payment of second-class fare.

(*c*) Free passages home and out again every five years, provided they undergo instruction for a portion of time whilst at home.

(*d*) *Leave* out of India to count from date of embarkation on departure, until date of disembarkation on return. At present this is only for leave on Medical Certificate.

(*e*) *Pay.* Full staff pay to be allowed to the officiating incumbent in a privilege leave vacancy, and also to those officiating in vacancies caused by Officers at classes or absent on duty.

(*f*) *Passages.* Free passages to the United Kingdom or wherever they wish to settle should be given to Indian Army Officers and their families on retirement. At present this is only allowed to Officers of the Indian service compulsorily retired *otherwise than on account of age* (para 61 (b) A. R. I., Vol. X.).

(*g*) *Chargers.* If it is too much to expect chargers to be provided free and fed free, I consider Infantry Officers should be allowed to purchase them from Remount Depots.

(*h*) *Pensions:*

1. Those for Officers, I understand, are under revision.
2. The Indian Military Service Family Pension Fund. I hope this will be revised and the pension admissible to widows and children considerably raised.

   This fund is a very unsatisfactory one from the bachelor's and widower's point of view, as, although both are *compelled* to subscribe to it, the former gets nothing back when he retires, neither does the latter should his wife predecease him. This, I consider, calls for remedy.
3. A statement should also be published periodically showing how this fund stands. I do not recollect ever having seen such a statement.

EXTRACTS FROM FINDINGS OF THE SELECT COMMITTEE OF SENATORS OF THE UNION GOVERNMENT OF SOUTH AFRICA APPOINTED TO CONSIDER THE SPREAD AND REPRESSION OF THE DISEASE EAST COAST FEVER.

As reported in the Natal Witness, Wednesday, August 4, 1920.

"The prevalence of East Coast Fever has cost the country millions of pounds."

"It is possible to stamp out the disease in two years."

"The Transvaal Crown Colony Government of the day attempted to stop the disease by fencing off. . . . When it was realised that fencing was not effective the Government resorted to the expedient of killing off herds, large and small, to such an extent that the northern districts of the Transvaal became almost denuded of cattle."

"Col. Watkins-Pitchford investigated the matter through scientific research, and made known to the world that only systematic dipping of cattle at short intervals in a solution which would kill the tick, procured the remedy for East Coast Fever.

"Sir Arnold Theiler then followed up Col. Pitchford's theory, and after elaborate scientific experiments at the Government Laboratory announced that the Pitchford theory was correct."

"The evidence adduced before your Committee has the outstanding feature of furnishing overwhelming proof of the efficacy of dipping and hand-dressing as recommended by Col. Watkins-Pitchford as the only antidote to effect the eventual eradication of the disease."

EAST COAST FEVER.

Recognition of Work done in the Direction of Overcoming Plagues in South Africa.

By GEORGE D. ALEXANDER.

I BELIEVE the most valuable work done for the good of agriculture in South Africa has been the work of those who have given us the means to combat the plagues which we have had to contend with.

South Africa has little reason to be proud of its attitude towards those who have done so much for the general good.

I could cite many incidents illustrating what I mean, but these articles have run to a much greater extent than I anticipated they would, and I will only mention a few.

Gilbert Wilkinson, of Ottawa, Natal, was the first to demonstrate that by the use of arsenic and treacle sprayed on the locusts in the hopper stage the plague of locusts could be combatted. The process was improved on, and a system established later, largely by the efforts of Mr. C. Fuller, the Natal Entomologist. The means of dealing with the locust plague was solved, and it has proved a godsend to the country. I believe Mr. Gilbert Wilkinson received a gold watch or a piece of plate subscribed by a few individuals.

The Hon. Joseph Baynes, C.M.G., who initiated the creamery industry at Nel's Rust, and who initiated the first successful bacon factory at Nel's Rust, introduced the first cattle dipping tank and advocated the adoption of dipping in the face of strong opposition, and by this action laid the foundation stone of making possible the eradication of East Coast fever (which Professor Koch stated would sweep from the Zambesi to Capetown) and other tick-borne diseases. It is through the introduction of the dipping tank that the quality and value of cattle have increased so wonderfully, but for the means of controlling the tick plague there would be no high-class stock in the country. I have noticed writers attributing the advance in the improvement of cattle to agricultural shows, fat stock sales, etc., but that is a great mistake. Dipping has been the solution. Mr. Baynes received from a comparatively few farmers an album containing their signatures.

Col. H. Watkins-Pitchford, F.R.C.V.S., the late Bacteriologist to the Natal Government, and prior to that Principal Veterinary Officer for Natal, did more for Natal and South Africa in the matter of scientific work in connection with stock diseases than any scientist who has ever been in South Africa. To enumerate all that he did cannot be done in this article, but I will mention one or two of his investigations. His investigations into pleuro-pneumonia. His investigations into horse sickness (he was the discoverer of how horse sickness is conveyed). His investigation with Dr. Theiler into rinderpest (they produced the serum treatment which is now used wherever rinderpest appears, and which has made this terrible plague easily controlled). His investigation into tick destruction, which has solved the problem of how to eradicate tick-borne diseases, and has not only given the means to eradicate East Coast fever, but redwater, calf disease, gall sickness, opthalmia, botts, biliary fever and probably many others. He evolved a snake poison serum and prepared this, and it proved effectual for even the venom of the mamba.

At the Illerton Laboratory, Natal, where his investigations were conducted when he was not in the field, he was assisted by his brother, Dr. Watkins-Pitchford, who invented the "Isometer" for testing the strength of arsenical dips.

In Face of Disabilities.

His valuable investigations were carried out in the face of very great disabilities. Money to carry on investigations on a proper scale was never provided. Over a period of five years the total amount granted for investigation of diseases was £5,000, or at the rate of £1,100 per annum. Natal suffered from a succession of Ministers of Agriculture (with one exception, Mr. Clayton, and his efforts were nullified by a majority of his colleagues), who neither understood nor appreciated the value of scientific investigations, and with few exceptions all the members of the different Assemblies, both in the Upper and Lower Houses, were equally incapable of realising the importance of investigations.

I make this statement with full knowledge, because as President of the Agricultural Union at the period I refer to I approached the

Ministers and Assemblies and Councils on several occasions. In addition to the absence of funds there were continual pin-pricks from the Jacks-in-office of the Agricultural Department. I believe that when the dipping tank was erected in which Colonel Pitchford made his experiments in regard to dipping he was limited to £80, and though he did some of the manual labour himself, the cost came to more and he was told he would have to pay the difference out of his own pocket. Whether he actually did so I cannot say, but I would not be surprised.

When Union came about Colonel Pitchford, who was senior in service, was passed over and Mr. Theiler (he was not Sir Arnold then) was appointed. Theiler decided to close up Allerton, and notified Colonel Pitchford he would be required to go to Pretoria and work under him. This Colonel Pitchford declined to do, and resigned.

His valuable horse-sickness work and the finding of an immunising inoculation, which, I believe, was on the eve of being crowned with success, was lost to South Africa. His system of producing anti-venom serum was lost to the Colony (it cannot be obtained now). His valuable research work into tick-destruction has been lying pigeon-holed until the Select Committee dragged it out into light after ten years. To support this let me quote the evidence of Senator James Schofield given before the Select Committee (Page 90, Question 1,247):

"I wish to draw attention to the neglect of the Department of Agriculture in not making known to the public the information in their possession pertaining to East Coast fever; as an instance, take the very important report on 'Dipping and Tick Destruction,' Part IV., by Lieut-Colonel H. Watkins-Pitchford, which was sent to the Government before the writer left South Africa early in 1911. It was not until June 15, 1912, that only 500 copies were printed at Pretoria, whereas other publications were issued, as follows:—'Prevention and Eradication of East Coast Fever,' Theiler and Christy, August 13, 1906, 5,000; 'Stygziekte and Lamziekte,' Theiler, May 1, 1912, 1,000; 'East Coast Fever,' R. W. Dixon, May 12, 1914, 1,500; 'Redwater and Gallsickness,' R. W. Dixon, July 12, 1917, 6,000.

"I made repeated applications for Colonel Pitchford's report, No. IV., before getting one, and from my knowledge of this report and his others I believe it would pay the Government to have thousands of them, instead of only 500, distributed in both languages."

LOST TO SOUTH AFRICA.

I maintain that much of Colonel Pitchford's valuable work has been lost to South Africa through professional jealousy, and that the treatment he received from South Africa was enough to break any man's heart. I would like to draw attention to the fact that through his discovery of the medium of conveyance of horse-sickness and his recommendation of burning smoke-producing material in stables and the knowledge acquired that the mosquito conveys the disease, and also the discovery of the three-days Laboratory Dip (not arsenite of soda) thousands of horses are saved annually from horse sickness.

By the discovery of the serum treatment for rinderpest the disease was eradicated, after a loss in Natal alone of 2,000,000 head of cattle in eight years, which, if valued at £5 per head, indicates a loss of £10,000,000, while in the Cape Colony and Free State all but wiped out the cattle. Through his investigations into East Coast fever and tick destruction he gave the country the solution of how to eradicate the disease, from which very many thousands of cattle have died since the disease appeared, representing a money value of millions of pounds. His reward from South Africa was to be placed in the position that he had to retire from the service. A few admirers presented him with a silver tea service. Thus was the gratitude of South Africa, and especially the agricultural community, exhibited.

When we see honours given to men whose only apparent service, as far as we know, is having managed to make more money than others out of manipulating the share market and services such as I have enumerated quite ignored, it makes one "furiously to think."

CONCLUSION.

The point I have tried to impress is that East Coast fever can be eradicated by consistently following out Colonel Pitchford's advice.

Several witnesses, in giving evidence, mentioned that, notwithstanding three days' dipping, the cattle still continued to die, and some farmers in Natal were stated by Theiler to have raised the question whether it was possible that, owing to constant dipping, we have been breeding a tick that is arsenic resistant ? and Theiler went on to say, "I could not answer that question either in the affirmative or the negative."

I would like Sir. A. Theiler to inform me :—If, according to Colonel Pitchford, by adoption of three days' dipping with the Laboratory formula, no ticks, even if a few may have vitality left to lay eggs, are hatched out, now, then, ticks can become arsenic resistant ?

Again, Theiler says :—" There is a possibility that we may have a chronic form of East Coast fever and that may explain why we have not been making headway in fighting diseases during the last ten years."

I would submit that it will be time enough to raise those issues when we have disproved what Colonel Pitchford proved, viz., that with a dip that will admit of continuous use every three days for an extended period (which arsenite of soda will not do), and will protect the animal for 72 hours (which arsenite of soda alone will not do), East Coast fever has been, and can be, eradicated, even on infected veld, and it may not be necessary to discuss further, "Why we have not been making headway in fighting the disease during the last ten years."

Sir A. Theiler is a clever scientist and a hard worker. He also knows how to humour the farmer, but Sir A. Theiler has made mistakes in the past, mistakes fraught with serious consequences to the agricultural community. His initial attitude over dipping was one of them.

In the foregoing articles I have dealt with East Coast fever and tick destruction only, and I have only made passing reference to scab in sheep and horse-sickness.

I would like to point out before closing that Colonel Pitchford proved that scab in sheep could be eradicated with the three days' dip (Laboratory formula). Further, that to show the dip would not injure the sheep, he dipped a flock of sheep every week for sixteen weeks, with no bad effects to the sheep, which "remained in excellent condition."

With regard to horse-sickness. Although he does not refer to this in his pamphlet, he told me before he left South Africa that he believed that the three days' dip (Laboratory formula, including paraffin and soap) would prove a preventive against horse-sickness.

PREVENTIVE OF HORSE-SICKNESS.

I understand from Mr. John Morley, Secretary of the Durban and Coast Society of Agriculture and Industries, that the military, while occupying the Show Ground in Durban during the war, dipped the horses and mules regularly with Col. Pitchford's formula, and that the number of animals sometimes reached a total of 8,000. At first the tank was inadequate, but latterly a first-class tank was erected. During the first year there were six deaths from horse-sickness, the second year two deaths, and after that no deaths. I understand Mr. Morley has written a report on this, which the Agricultural Department might do well to obtain and publish.

I believe that the three days' Laboratory dip (not arsenite of soda alone) will prove a preventive of horse-sickness, and that if this had been made known the enormous fatalities in mules and horses along the coastal districts of Natal and in Zululand during 1919-20 might have been prevented, or, at least, greatly minimised, by dipping or effective spraying every three days with Colonel Pitchford's formula.

I trust that this series of articles will have enlightened some as to the East Coast fever disease, and the possibility of eradication, and may direct attention to what I consider is the cause of the non-success of the Government in dealing with the disease. If I have only succeeded in creating some intelligent interest, and in removing some of the wrong impressions and apathy existing, I shall feel I have not written altogether in vain.—*Natal Witness.*

Clinical.

CHRONIC PERITONITIS WITH ADHESIONS IN A DOG.

By Major C. G. SAUNDERS, D.S.O., B.V.Sc. (Toronto), M.R.C.V.S.,
(*Worthing*).

THE patient, a six-year old Samoyede dog, male, was brought in to the hospital with a history of intermittent attacks of persistent vomiting, foul breath and gradual loss of condition since about the beginning of July last, and also that about a week previous to his admission he was suspected of picking up and swallowing a pebble on the beach. Upon enquiry, it was found that picking up stones was not a habit with him and that he was not seen with the pebble in his mouth, but was seen to swallow something. Upon examination, the mouth was found to be in an advanced state of sepsis from decayed teeth, tartar, and ulcerated gums, and there was every indication that these conditions were having a deleterious effect upon the general health. The bodily condition was fair, but on the thin side, temperature normal, pulse rather weak and frequent. Palpation of the abdomen revealed no pain or tenderness in any region, but hard pressure in the gastric region produced vomiting, the vomit being fluid, clear and bilestained. The hindquarters were stained and soiled with liquid fæces, but the owner gave a history of constipation and difficulty of defecation. The gait was cramped and difficult, the back being slightly arched and the abdomen tucked up. There was a general air of lassitude and *malaise* about the animal and the expression was rather anxious. Diagnosis as to the actual abdominal condition was reserved until after *X*-ray examination, which was deemed advisable, as it was clearly something more than an ordinary case of gastritis, and the possibility of a foreign body could not be overlooked from the history of the case. With the double purpose of allaying the gastric irritation (on which it had no effect whatever) and making the intestinal tract more visible during the *X*-ray examination, large doses of bismuth sub-nitrate were exhibited. The mouth was cleaned up, the decayed teeth extracted and the tartar removed. By the kindness of a medical friend the patient was *X*-rayed, and a preliminary examination made with the fluorescent screen; followed by the making of a skiagraph. The *X*-ray showed up what appeared to be a dilatation of the intestine, and an exploratory laparotomy was decided upon as giving the patient the best chance of life. After proper preparation and with due regard to strict asepsis, the laparotomy was performed under morphia and chloroform anæsthesia. Considerable difficulty was experienced in gaining entrance to the abdominal cavity owing to the thickened condition of the parietal peritoneum and the adhesion of the great omentum along the line of incision.

The stomach and great omentum were stuck fast to the abdominal wall, and it was without a doubt the pull on the stomach from these adhesions that was responsible for the vomiting. The small intestine was matted together and in one place was constricted by a peritoneal band (thus causing the dilatation). The cæcum was pulled out of shape by adhesions and the bladder was closely united to the rectum. There was no exudate of any description, but the bowels themselves appeared rather congested, being of a much darker colour than usual. After carefully disentangling the intestines, freeing the stomach and bladder from their abnormal attachments, the wound was closed with two layers of sutures and dressed with an aseptic gauze and wool dressing, retained by an abdominal bandage. The patient recovered from the anaesthetic nicely and appeared to have stood the operation well, and a few hours afterwards was much brighter than he had been for some time past. He was eager for his nourishment, which consisted of fifteen minims of Bovinine every two hours, and which was retained. Twenty-four hours after operation the temperature was normal, pulse and respiration normal, condition excellent, apparently no abdominal pain and quite bright and cheerful. Six hours later he suddenly collapsed and died in a few minutes. *Post-mortem* showed nothing to account for the fatal termination; the intestines were normal in colour, no sign of peritonitis, wound beginning to heal nicely and every organ normal. At no time had he showed any evidence of shock, pain or exhaustion following the operation, and I am at a loss to account for the fatality.

This was a most disappointing case, although an interesting one, as there was no apparent cause for the peritoneal adhesions or why he should have died. The only consolation is that death from exhaustion was inevitable if operation had not taken place, and that he had his only chance of life.

A CASE OF ŒSOPHAGOTOMY IN A PUPPY.

By GUY SUTTON, F.R.C.V.S. and HAROLD STAINTON, M.R.C.V.S.
(*Kensington*).

A WELL-BRED Airedale terrier puppy, aged from 10–12 weeks, gulped down the greater portion of a vertebra from the middle third of an ox tail. The mass was about the size of a pullet's egg, with several jagged processes, and lodged firmly midway between the pharynx and the entrance into the chest. It was extraordinary how such a large body had passed through the pharynx.

The appearance of the little animal was distressing. The obstruction had been in existence about forty-eight hours and the prognosis was distinctly bad. The skin over the mass was painted with iodine, hair clipped off and the area anæsthetised with eucaine. An incision slightly over an inch in length was made through the skin parallel to the long axis of the neck and the distended œsophagus was exposed. This was then split in the same direction and stretched open by means of blunt hooks, the bony mass being extracted by the aid of a pair of toothed forceps, requiring a good deal of force and manipulation to effect its clearance. The area was again painted with iodine and the wound left unsutured and unbandaged. Rectal feeding was carried on by means of suppositories and forty-eight hours were allowed to pass before anything was given by way of the mouth. He was then offered and took readily a tablespoonful of warm sugar water. This was lapped from a saucer on the floor and apparently the whole escaped through wound. If any entered the stomach the amount must have been exceedingly small. The meal was repeated at the fourth, eighth and twelfth hour, the idea being to irrigate the wound from within outwards with this non-irritating solution and any which reached the stomach would be a valuable food. On the fourth day milk was offered at intervals and taken greedily, but escaped freely through the wound, and, in spite of the continued rectal feeding, the eighth day found the pup rolling in his gait and rising with difficulty. The wound was large and gaping, but it was quite sweet and free from suppuration. Whilst offering milk in the evening it was noticed that if a saucer was so held that the neck was extended and the head raised, the milk passed down the œsophagus without a leak. On lowering the head, however, escape occurred and was stopped by placing a finger below the wound and so damming the fluid back into the stomach. After an interval of two or three minutes the fingers could be removed with safety. The meal was repeated in about half-an-hour and the pup much refreshed. During the following days a good deal of nourishment was taken this way and the rectal feeding was discontinued. The puppy gained weight and vitality, and the wound, douched from within with sugar solution and painted without with iodine, healed rapidly and was completely closed by the twelfth day. The food was now minced raw beef and bread and milk and the puppy with every appearance of health returned home. The crux of the favourable termination of this case was undoubtedly the ability of the longitudinal incision in the œsophagus to remain closed and conduct fluid into the stomach when the neck was extended and the head raised.

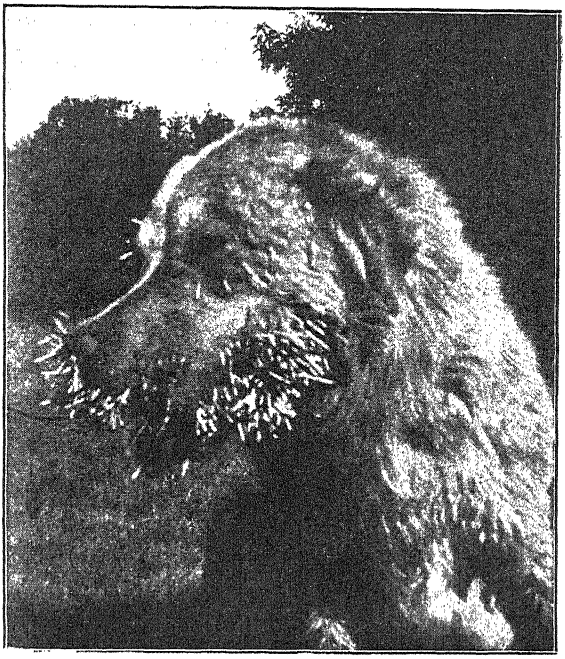
The maintenance of a clean wound can be greatly attributed to the internal irrigation with sugar and water. It is a wound dressing which was in use in very ancient times and possesses, apparently, the cardinal virtue of being completely non-irritating.

RESULT OF A DOG AND PORCUPINE FIGHT.

By ADRIAN C. HOBDAY,
Tuxford, Saskatchewan, Canada.

I THOUGHT that perhaps the enclosed photograph might be of interest to the readers of THE VETERINARY JOURNAL, as it illustrates pretty forcibly the great damage which a porcupine can do to a dog.

The dog was a large cross-bred Newfoundland weighing 160 pounds, an excellent guard and one trained to do harness work. Late one night, in company with a terrier, it attacked a porcupine, and after a stiff fight the latter was killed. Hearing the noise of the scuffle (as this all took place close to the door of my "shack") I went out with a lantern just in time to see the end of the combat. The porcupine was at its last gasp, but both dogs were properly "quilled." I took the terrier indoors and extracted his quills at once, as they were not very numerous, but the big dog ran away and I did not see him again until the next day. He was, as can be seen by the photograph, in a terrible state, and the inside of the mouth—the roof, tongue, palate—was so thickly studded with quills that I could not get a knife blade between them. It seemed to be one solid mass of quills. I attempted



to pull them out, some being so firmly inserted that pliers had to be used. Large and small, there were over a hundred quills, and just as we were finishing the dog collapsed and died.

AN INTERESTING POST-MORTEM EXAMINATION.

By W. R. McKINNA, M.R.C.V.S.
(Huddersfield).

THE subject of this note was a fox terrier, much valued by his owner for rabbit shooting.

History.—The fox terrier had been in the owner's possession for some five months, and had gradually lost condition, until when brought for examination he was in an emaciated condition. The pulse was 140 beats to the minute, and this tachycardia never varied until the day of the dog's death. Respiration was frequent, both the inspiratory and expiratory efforts being very marked. There was no history of a cough, and auscultation revealed only a slight dullness on the right side of the chest.

The callus of a fractured rib was noticed and the owner volunteered the statement that the dog had been run over a short time before he got him, but had apparently been none the worse for his accident. Treatment was continued for a period of three weeks, but there was no alteration in the frequency of heart beat, or character of the respirations. At times, it was noticed that a peculiar "thud, thud" noise could be heard suggestive of the sound heard in cases of spasm of the diaphragm.

It was suspected that at the time of the accident to the dog, some six months previously, a partial rupture of the diaphragm had taken place with a resultant diaphragmatic hernia of some portion of the viscus.

The dog was destroyed, and a post-mortem examination made.

Post-Mortem Examination.—This revealed a remarkable condition, the chief points of interest being as follows :—

The right half of the diaphragm was absent, only the points of attachment remaining. The left half was normal. The thoracic and abdominal cavities were confluent, and contained about a pint of clear fluid. The whole of the liver was in the chest cavity, pushing the right lung far forward. The heart was much enlarged and the heart muscle very flabby.

In view of the condition of things as found at this examination, it is little short of marvellous that this dog lived so long after its accident, which undoubtedly was the cause of the lesions found. Up to a few days prior to his death, the dog was always fairly brisk and alert, and had a good appetite.

RADIAL PARALYSIS IN A DOG.

By W. R. McKINNA, M.R.C.V.S.
(*Huddersfield*).

The fact that this condition is rarely met with in the dog, and that faradaic treatment met with so much success in this case, will perhaps prove of interest.

History.—The subject was an Airedale dog, 6 years old. First seen lame on returning from a ramble. He was in the habit of jumping gates and walls. When first seen lameness was not very marked, but became acute in a few days' time. The limb was dragged and the condition of "dropped elbow" could now be easily recognised. There was much pain on pressure over the axilla in the region of the brachial plexus.

Treatment.—Rest, gentle massage of the axillary region, and internal administration of aspirin, were prescribed, but after three weeks the lameness was even more marked than before. The extensor muscles of the elbow were atrophied.

Faradaic treatment was then commenced, and was followed by a great improvement in a week's time. Daily use of the battery and regulated exercise brought about a complete recovery in a month, the atrophied muscles regaining their tone and strength very rapidly.

The patient proved very amenable to the electrical treatment—a very helpful factor.

The injury to the nerve was probably caused by severe bruising of the axilla, brought about when the dog made a faulty jump.

REMARKS ON SKIN PIGMENTATION IN THE DOG.

By G. H. LIVESEY, M.R.C.V.S.
(*Hove*).

In some kinds of dogs, especially the Airedale and Welsh terriers, it is a common thing as age advances to notice increased pigmentation of the skin, and at the same time a loss of the richer shades of colouring of the hair. This seems to be a natural process to some extent in all animals. But occasionally one meets with cases even in young dogs where as the result of skin-irritation and loss of hair, deep pigmentation is left as a result, disappearing again after a lapse of time. In a few cases the pigmentation remains permanent and may even extend in area, causing a progressive loss of hair. I have seen many such cases as a result of follicular mange. There are also cases of follicular mange which are very difficult indeed to diagnose where no pustules are formed, and the principal symptoms are progressive loss of hair, thickening of the skin, scaliness, and pigmentation, which is permanent. Possibly the demodex may be only demonstrated in one out of ten such cases. All these conditions have been recognised and commented on for many years.

During the last twenty years, however, I have seen a very few cases that I should not like to classify with any of the above. I will describe a typical one. An old wire-haired fox terrier (about 10 years) had a small, nearly bald patch on the front of the neck, where his collar rubbed it. This, after being present for years, began to turn black, and spread. About a month later the coat became thin at the hinder end of the back, all the undercoat (or fur) being lost and the skin was noticed to be black where once it had been pink. In the course of a further couple of months the black area had extended down the sides of the hind legs and slightly along the tail, the flanks, and the front of the chest. The legs and feet and sides of the chest and shoulders were quite free. There was no moisture, no scaliness or scurf, *no irritation*, no smell and very little thickening of the skin. No demodex was found at any examination and no pustule was ever seen. Various remedies had been tried and many " hair restorers " used, but all to no purpose. At the outset the collar was destroyed and a new one, thoroughly disinfected, used in its place and then only when the dog was in the street. After a warm bath on one occasion it was noticed that at the edge of the extending black area, there was a faint inflammatory zone about an eighth across. This disappeared when the skin was dry. The dog is still alive and apparently enjoying the best of vigorous health.

This morbid condition of the skin is not to my knowledge dealt with in any veterinary text-book ; I am not aware that melanosis is a truly pathological condition apart from certain new growths, such as sarcoma. I should like to ascertain if it arises from some tissue change in the animal itself or is dependent upon the presence of some undiscovered animal or vegetable parasite acting as an external source of irritation.

THE SECOND INTERNATIONAL CONGRESS OF COMPARATIVE PATHOLOGY.

This Congress, to be held in Rome in April, 1921, will be a combined meeting of medical and veterinary scientists of all nations, and will include discussions on many subjects. Some of the title headings are :—" Influenza in Man and Animals," " Foot and Mouth Disease," " Cancer and Sarcoma," " Rabies," " Rinderpest," " Fowl Cholera," " Bee Disease," " Dibothriocephalus latus in Men and Animals," " Silk-worm Disease," " Piroplasmosis," " Mange in Man and Animals." The subscription to the Congress is 40 lires, and further particulars as regards reduced rates for travelling, etc., can be obtained from Professor Nuttall, ScD., F.R.S., Cambridge.

NOTES ON CERTAIN CASES OF DERMATOMYCOSIS OF CATTLE.

BY H. A. REID, F.R.C.V.S.,
Veterinary Bacteriologist to the Department of Agriculture, New Zealand.

SOME rather remarkable cases of skin disease affecting cattle recently came under my observation. The subjects of the complaint were cattle of the Red Devon breed, kept under open conditions on a large station in New Zealand.

A similar case had been reported as occurring about eighteen months ago. I did not see it. The animal, a bullock, was slaughtered when *in extremis*, presumably from the deplorable state into which it had fallen owing to the extensive skin affection, though possible there may have been some superimposed ailment which had led to its moribund condition. Its body exhaled an intensely foul odour, and the skin presented the lesions shortly to be described. Further cases were reported some months ago. These I had the opportunity of seeing.

Six stud Devon bulls out of a herd of thirty-two animals were affected with a chronic dermatitis which had evidently commenced as a localised lesion on the loins, and had spread thence to the sides, abdomen and legs. A six months old calf was also slightly affected.

The lesions were peculiar and had evidently been present for some considerable time before being noticed. They consisted of a greatly thickened, cornefied epidermis, fairly easily detached in some places, firmly adherent to the subjacent tissues in others.

Removal of the scab exposed a moist, hyperæmic base, with a sticky, greyish exudate possessing a characteristic sour, musty odour. There did not appear to be any great amount of irritation. The affected animals did not respond to scratching, and removal of the scabs caused evident pain. Occasional lashing of the tail, as though to dislodge flies, though there were practically no flies about, it being late autumn, was the only indication of any discomfort.

Slight loss of condition, and some degree of fever—103.4 being the highest temperature registered—were also noted.

On my next visit a heifer had been found on the run very badly affected. She presented an extraordinary appearance. Almost the whole body seemed to be covered with the thick, greyish, epidermal scabs, which in some places had become heaped up and projected half to one inch from the surface of the body. The inside of the ears, around the orbits and nostrils, the thighs and abdomen, all presented similar lesions, giving the animal, from a short distance, the aspect of being coated with mud, and recalling the appearance seen in a severe case of ringworm. The heifer was in poor condition and exhaled a putrid odour. She was destroyed as being worthless. I secured specimens from the skin, and also scabs from the affected bulls, which I collected in a sterile test tube.

Smears made from the exudate adhering to the scabs and examined microscopically presented a very striking appearance, the most notable feature being the mycelium of a mould collected together here and there in felted masses. Cocci were also present, but careful search failed to reveal the presence of the necrosis bacillus which it was thought might be implicated in the production of the lesions. Experimental inoculation of calves, by the process of rubbing some of the scabby material into the skin with or without previous scarification, led to infection with the disease.

On the fifth day following inoculation, the skin was seen to be hyperæmic, and on palpation the commencing eruption could be distinctly felt. Two days later the condition was well marked. The skin was rough and scabby—the scabs being firmly adherent. The hair over the inoculated surfaces had not been shed. In ten days' time typical lesions had been set up. The sour, musty odour was noticeable, the skin felt greasy, and was tender and painful to the touch.

The scabs could now be detached. Microscopic examination revealed the same appearance as in the original cases, except that the mould was not quite so luxuriant. It was invariably associated with the presence of cocci.

Other smaller animals, rabbits, guinea pigs and fowls, proved refractory to inoculation in any form.

Cultures made from the material collected from the skin gave rise to a profuse growth of staphylococci.

Special methods of cultivation for the isolation of the mould were undertaken. The most satisfactory of these consisted of enclosing a portion of the scab between two "moist chamber" slides sealed along the edges with wax. These were then placed in a sterile Petri-dish lined with damp blotting paper, and incubated in the dark at room temperature. Seven days later the mould had started to grow out from the edges of the scab in a very beautiful manner.

Inoculations from this culture were made on to plates of acid agar and gelatine. The agar plates incubated at 37° C. showed after twelve hours the growth of a white mould consisting of a mycelium of branching, septate hyphæ, showing chlamydospores.

With such literature as I had at my disposal, and with the aid of Coupin's " Atlas des Champignons Parasites et Pathogénes de l'Homme et des Animaux," I attempted to classify the mould, which corresponded most nearly with that of Epidermophyton Gallinæ (Megnin)—a fungus which cause favus of birds and is inoculable to rabbits, mice and the human subject, though not to rats. Dogs and cats are said to be susceptible, and, to a lesser degree, horses. Favus of man is said to be transmissible to cattle, though, so far as I can gather, naturally occurring cases in bovines have not been recorded. Attempts to infect cattle with pure cultures of the mould did not succeed, nor did infection result when it was combined with cultures of the staphylococcus. The weather was cold and rather wet, conditions which may be disadvantageous to artificial inoculation with moulds. It seems evident that the mould isolated could not have been that of epidermophyton gallinæ, unless modification of its normal nutritional material had rendered it innocuous to the species generally attacked. In the absence of expert advice, I am unable satisfactorily to decide these questions.

The disease set up by the artificial inoculation of cattle with material derived from the original cases, ran a benign course, and cleared up, without treatment in from four to six weeks.

Treatment of the old-standing cases with 2½ per cent. Creolin in water proved effectual, though tedious owing to the protection afforded to the organism by the thick scabs, which rendered the skin almost impermeable in some places of the dressing. Preliminary washing with soap and warm water, followed by the application of the warm antiseptic, yielded the best results.

A feature of the cases which requires explanation is the situation of the lesions on the loins. This appeared to be the predilection seat of infection in naturally occurring cases. The loins are the one part of the animal's body which should be less liable to infection, since they do not as a rule come in contact with the ground or other objects, and cannot readily be reached with the mouth or tongue except by other animals. On the other hand this situation affords a broad, level surface, upon which spores may fall and rest.

The disease did not seem to spread to any extent among the herd, and did not in the first place attack the legs and forearms—parts which might become easily infected by contact through the habit cattle have of " jumping " each other.

Starlings and other birds make a practice of perching on the backs of cattle in search of lice or other skin parasites. Is it possible that infection might have been conveyed in this manner?

THE CASTRATION OF BULLS BY "CRUSHING."

By C. V. DALRYMPLE-HAY.
Deputy Commissioner (Retired) Madras; late President of Committee, Veterinary Hospital, Trichinopoly.

EMASCULATION of bulls by "crushing" has been in vogue in India for generations, and a more barbarous method cannot be conceived. Fortunately, it is not practised on our friend, the horse—at least, I have never heard of a single instance in Bengal, Punjaub, or Madras Presidency, where I was in the Madras Civil Service for over thirty years.

Horses are invariably "cut," except in a few places where the Afghan method of "malling" is adopted. This operation I have never allowed myself to witness. I understand it is very painful, and consists in severing the seminal duct by actual massage, leaving the testicles intact. I am also informed that the operation is not a long one, but that inflammation sets up within a few hours, and that the animal suffers terribly for days. It would be interesting if one of your readers who has seen this operation would kindly describe it in the VETERINARY JOURNAL.

"Crushing" the testicles of bulls is done at the age of about two years, and at a time when there is green grass available. The subjects to be operated on are led into the village square, back-yard, or selected field, thrown, and then pounced on by willing hands, each telling the other what to do and what not to do ! ! And midst much chattering and singing, the poor beastie is "added to the list"—a slow and very painful operation, as evinced by the groaning of the unfortunate animal.

It was precisely just such a crowd that attracted my attention the only time I ever let myself witness a case of "crushing." There lay the poor brute with all four legs tied. The operator started by placing a plank below the scrotum, and then massaged the latter with the palms of his hands. This he did for about half-an-hour when he rang the changes by tapping the scrotum with a smooth ruler until the contents were, as he said, "melted." This would be in any time from half an hour to one hour ! When completed, the unfortunate patient was released, beaten till he stood up, and then led away. No after treatment is required, beyond letting the animal stand in water up to the scrotum, which it is made to do for from two to four hours a day, provided there is a stream in the village, which more often than not is not the case ; failing which, the scrotum has "neem-oil" smeared over it once or twice a day, and it takes about three weeks for the case to be fit enough to walk about freely.

One can judge, then, how the operation of castration of bulls by ligature "caught on" when I was able to demonstrate to the farmers that in a very few minutes the operation was over, and also that the bullock at once began to graze, being able to walk a few miles to his master's house, from whence he would return two days later for the one and only washing out of the scrotum which, as a rule, was necessary.

I think I may claim that it was my voice, in the wilderness of the Madras Presidency, that cried with a view to putting a stop to "crushing" and the evil of branding, about each of which I have spoken often at meetings of the S.P.C.A. in the Madras Presidency, where in my long service I castrated thousands of animals for the farmers without a single death, I have taught many Hospital Assistants to perform castration with a view to burying in the past this horribly cruel method of "crushing," which should be condemned in all civilised countries. It is one of the things, too, which are put down as accursed in the Levitical Law.

INTERNAL PARASITES IN ELEPHANTS.

By M. C. Gupta,
Veterinary Graduate, India (c/o McGregor & Co., Tourgoo)

Diseases due to internal parasites are amongst the most important one has to treat in elephant practice. Sometimes animals die suddenly and the cause of death cannot be ascertained unless a post-mortem examination is held. On opening the bowels enormous quantities of worms are discovered.

Natural Infection.—The infection generally comes from fodder or stagnant, marshy water; also by drinking water contaminated by the fæces of an infected elephant, as the eggs are continually being passed out.

Symptoms in General.—Every elephant has a few parasites, but unless they are very numerous there are no functional disturbances, and a moderate invasion may cause no loss of condition. I need hardly say that the symptoms due to different parasites are often exhibited in the same case. The first prominent symptom visible in an elephant is that the animal resorts to eating a large quantity of mud, which is otherwise called "Earth hunger." Irritation of the bowels sets in, followed by a brisk purging, which is generally watery and dark coloured, containing large quantities of worms. Any debilitating disease may be a predisposing cause and prepare animals for infection. When the case becomes sub-acute there are digestive disturbances of an indefinite nature—then anæmia stands in the foreground of the clinical picture. In chronic cases debility and emaciation become more and more marked. The skin becomes dry and broken in some parts, and in advanced cases the extremities show œdematous swelling. There is at first constipation, later on diarrhœa, and the fæces are occasionally tinged with blood. Mucous membranes pale, eyes dull and present a peculiar look, which, to an experienced observer, indicate that the animal is suffering from worms.

In grave cases there is a rapid deterioration of condition and the appetite is entirely suppressed. Tenesmus becomes more severe, the fæces become quite fluid and very fœtid. At the same time the emaciation progresses rapidly, and the gait becomes staggering. There are also rises of pulse and temperature. The eyes are deeply sunk, the animals can no longer stand up, and they die from exhaustion.

As complications of the disease one can sometimes observe convulsions, and paroxysms of colic. The restlessness is remarkably violent; the animal lies down and gets up, turning the head towards the abdomen, indicating the presence of pain.

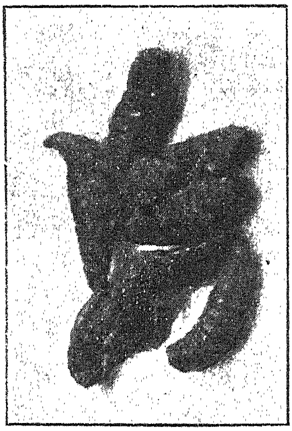


FIG. 1.—Bots from the Elephant.

Classification of Parasites.—With a view to giving an outline of the species of parasites frequently met with in elephants the annexed genealogical table will facilitate the study of the individual parasite.

(1) *Bots.* (botus, a belly worm). The larvæ of certain species of flies of the genus Œstridæ, which are conveyed into the stomach.

The fly is about the size of a bee and of a dark greyish colour. They are generally most active from the month of June to the beginning of October, preferably during the hot days of July, August and September. The fly deposits its eggs particularly on the fore-parts of the bodies of the elephants. The eggs are swallowed and hatch in the pharynx, œsophagus, stomach and intestinal canals. Instances of deaths caused by these parasites are not uncommon in elephants.

(2) *Round Worms.*—The family *strongylidæ* includes a large group of blood-sucking worms. Wet seasons favour the development of

the disease, as moisture ensures the life of the embryo outside the body of the animal. The disease is most prevalent on low-lying and swampy lands. It may be spread by the ova being carried in a stream of water, or by infested animals being introduced into a herd. It is probably necessary for these worms to pass out of the host in order to complete a portion of their life history. If the ova fall into water or moist places they may remain alive for several months and subsequently develop into adult worms.

Of the sub-groups of round worms (*a*) *Ascaris Lonchoptera* are met with in common with other groups of the same family. The body is pinkish white in colour; the head is usually slightly curved, and is provided with two lateral membranous wings which are broader behind than in front, and make the head resemble an Indian arrow. The parts infested are generally the small intestines.

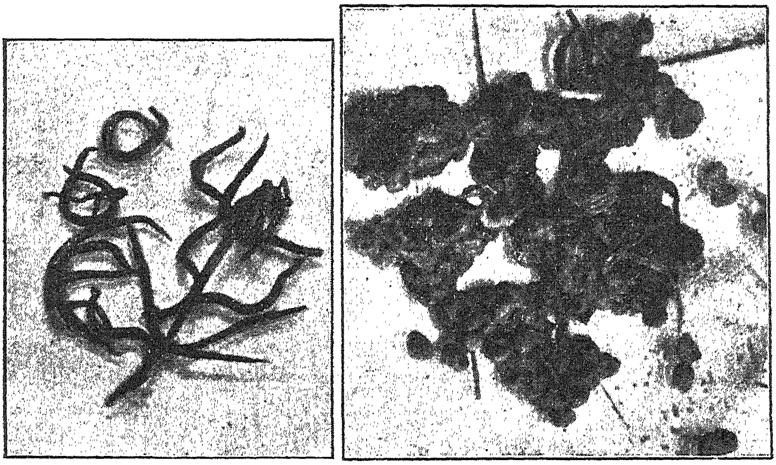


FIG. 2.—Ascaris Lonchoptera (Elephant).

(*b*) *Uncinaria* (*Ankylostomes*).—Under this species of worms we have two groups, viz.: (1) *Dochmius Sangari* (Cobbold) and *Uncinaria Os papiliatum* (Ostertag); (2) *Bathamostum Sangari.* They are very common in both Indian and Burmese elephants.

In *Fasciolidæ* group both Amphistomes and Liver Flukes are observed in elephants. Of 135 post-mortem examinations held by the writer, seven elephants were found to be suffering from both amphistomes and liver flukes.

Prophylaxis.—This consists in avoiding wet, marshy and suspicious pastures, and the separation of the sick animals as much as practicable. The animals should have access to good and, if possible, to running water. The evacuated dungs should be collected and soaked with the strong solution of a chlorinated lime. As regards diet, a liberal allowance of salt should be given, as there is little or no chance for these working elephants to have recourse to the natural salt licks.

Medical Treatment.—Santonin and areca nut prove the most effectual parasiticides. Areca nut is an irritant to the bowels and acts as a vermifuge. The following combination gives good results in ridding the bowels of these worms :—

℞. Powdered areca nut, ℥ i.
Crystal Santonin
Calomel $\overline{a\,a}$ ʒ ii.

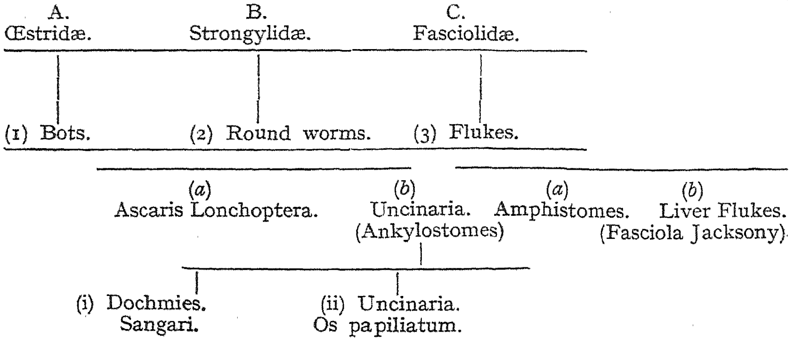
Mix Sig one dose at a time. Dose repeat in five days.

Method of Administering the above Recipe.—Tie the elephant up in the evening at about 6 o'clock and give him a dose of 8 ozs. Epsom salts. At 10 o'clock at night administer the above. A second dose of Epsom salts is to be given early next morning. The elephant is to be starved from 6 p.m. previous evening to 10 next morning.

Cachexia in the elephant is apt to be an accompaniment of parasitism, but it is a condition that calls for caution in the use of an anthelmintic. The cachectic animal should be put on a nourishing diet before treatment ; but if it is necessary to administer anthelmintics immediately use one which is not a gastro-intestinal irritant. For this purpose santonin is to be recommended. It may be remembered that santonin is not a drug which gives good results in single dose treatment, even when in large doses, and I have used such doses as 1-120th of a grain for every pound of weight (the average weight of an elephant is 6,048 lbs.). Tonics in the form of arsenic. iron, nux vomica, and gentian are most useful during convalescence.

Other anthelmintic drugs such as thymol, oil of chenopodium, turpentine oil, and similar kinds have not, in my experience, proved successful in elephant practice.

GENEALOGICAL TABLE OF INTERNAL PARASITES IN ELEPHANTS.



References :—Veterinary Journal; Hutyra & Marck—Special Pathology ; Kaupp—Animal Parasites.

DIPPING AND ITS EFFECTS IN VENEZUELA.

By E. MORGAN, M.R.C.V.S., D.V.H.,
(*Puerto Cabello, Venezuela*).

It is almost as essential, as it is to feed animals, to dip them in an efficient standardised dip at regular intervals, more so in tropical countries, where ticks and other parasites are a pest to animals which suffer so much from other skin diseases, such as mange (saona), etc. In most countries dipping is now carried out systematically. Dipping tanks are fixed in various districts so as to make it as easy as possible, and so that the animals have not to travel long distances to and from the baths.

As a result of regular dipping it has been proved that extensive areas of land can be used for cattle breeding, which not long ago were considered to be dangerous to place cattle and other stock to pasture or even travel over. Deaths have been reduced in some countries by 80 per cent. as a result of regular dipping. Not only this, but the animals are able to thrive better and also yield better weights. They are healthier in all respects. Imagine the amount of blood these parasites—ticks—absorb from each animal! When they first adhere to the skin one can hardly see them with the naked eye, but when they get fully gorged one is able to see them at a distance; and they are now about one-third of an inch long and full of blood which they have deprived the host of. One can imagine the amount which is necessary to be drawn from one animal so as to fill thousands of these ticks. They cause, also, a great deal of annoyance to the animals, apart from the blood which they deprive them of, and often after they drop off the punctured skins are the seats of maggots, etc., owing to flies blowing on these injuries. But more serious still are the diseases they transmit. Chief amongst these is "Redwater," or "Tick-fever" (Tristeza) or better known as "Texas fever," because it was in Texas cattle that Smith and Kilborne discovered the blood parasite which causes the fever. They proved also that it was conveyed from one animal to the other by the *tick*. The disease is not so dangerous and fatal to animals bred in tick fever countries as it is to imported animals; to the latter it is fatal in the majority of cases. This small parasite, called "piroplasma," gets into the red corpuscles of the blood and breaks them down, with the result that the hæmoglobin or colouring matter of the blood is passed out with the urine, which is as dark as the blood itself, and finally the animals die very soon of anæmia and exhaustion.

One might ask: In which way will dipping prevent this tick infection, because, even if it kills the ticks which are attached at the time to the animal's body, yet the pastures being plagued with ticks, others will attach themselves on again? Yes, they will; and that is the idea of dipping stock, which should be done by night at least once every fortnight, inasmuch as that the effects of the first dipping passes away in a week or so, *then the cattle will collect fresh ticks*, and these again should be destroyed by dipping before they get time to lay their eggs, as each tick lays thousands of eggs. The dipping does not usually destroy the ticks outright, but it takes several days for them to absorb the poison of the dip which has penetrated the animal's skin. Even if some of them drop to the ground alive, it has been proved that the poison has already destroyed their power of propagating any further offspring, and finally they shrivel up and die.

In some of the southern states of North America they have declared them free of ticks, as they made it compulsory to dip all the cattle there at regular intervals, so after several years they have been crowned with success, and in a few years hence it is expected that all the Southern States will be declared free of ticks and the number of deaths reduced to a minimum. Even with the expenses of labour, etc., at the time of dipping, they were then more than compensated with the weights and number of cattle saved. They were losing from one to two dollars on each hide, as the badly infected hides were punctured and could only be used for making low grade leather.

The best dip to be used is the arsenical dip, and Wm. Cooper, Son and Nephews, Berkhamsted, England, have been the pioneers and are second to none in preparing a most reliable arsenical dip, which is economical in all respects. It can be used by mixing with cold water (not *hot*, as used to be the case), and this saves a great deal of trouble in lighting fires out in the open. This is the dipping material which is used almost all over the world—even in the U.S.A.! And they are not too ready to accept foreign goods; yet they admit that it cannot be beaten, and it is considered as their universal dip. I believe the firm has a factory now in Chicago. It is waste of time and labour to use anything except a reliable dip. This firm, by supplying almost all the dipping stations of the world, are able to turn reliable material out cheaper, and they have made a special study of it.

It has been calculated that the cost of eradication is only about 2s. 6d. a head, so it should more than compensate in the hide alone. Cows yield at least one quart more milk daily when they are free of ticks and other parasites. I estimate that an average Venezuelan bullock, when put in a tick-infected potrero to fatten and dipped at regular intervals, will increase in weight from 10 to 15 per cent. more than if the animal was not dipped and allowed to be molested and deprived of blood by ticks.

So far as Venezuela is concerned nothing has been done in the way of dipping—at least as far as I know.

The worst areas by far are the fattening potreros in this country· I have noticed that ticks are by far more prevalent on cattle coming from the potreros than when they enter there. Cattle come from different areas and are crowded together on the potreros, more so than in the open plains. Burning the potreros seems to be one easy way to get rid of the pest, but it is also an easy way of destroying many of the finest or more delicate grasses which do not root deep in the soil.

Cattle should not be dipped during the course of a journey, but should rest a day or two at the journey's end before being immersed in an arsenical bath. All cattle should be dipped before entering the fattening potreros, especially so if it is intended to adopt a system of dipping to eradicate the ticks from the land. There should be a convenient quarantine potrero to hold the tick-infested animals, so as to rest after the journey before they are immersed.

They should endeavour to clean the potreros of ticks in the first place, then extend it to the plains. It is a big problem ; all the same it should be tackled without further delay, so as not to be behind other countries on this important cattle question. It is outside the question altogether to expect fat grass-fed cattle where ticks are a plague.

This article also appeared in Spanish in *El Universal,* which is one of the two leading papers in Venezuela.

EVERSION OF THE UTERUS.

By GEORGE GAIR, M.R.C.V.S.

(Canon Bridge, Ross-shire).

The first recognition of eversion of the uterus is by Hippocrates (Denuce, Traite clinique de, l'Inversion Utrine, Paris, 1883), who has directed a plan for its restoration. The same author quotes a passage from Aretosus, who not only describes the occurrence but also refers to the traction upon the umbilical cord as one of the causes. Such great authorities of ancient medicine as Moscheon, Galen, Paul of Ægina, and others, all refer more or less distinctly to the condition as an accident of child-birth in the human subject.

Eversion of the womb may be favoured by a relaxed state of the organ through over-distention, of rapid delivery or of hæmorrhage, the immediate cause being pressure exerted from before or traction from behind. The result may proceed from straining efforts or in attempts at placental expulsion before uterine contraction occurs. Henning concludes that attachment of the placenta to the fundus instead of a more lateral attachment is an active cause of the accident. Hæmorrhage is occasionally seen and not infrequently the patient suffers and may even die of shock. Spontaneous reduction of incomplete eversion in the human subject is not uncommon. Spontaneous reduction of the complete form has likewise been observed due to retraction of the ligaments acting on the uterus when in a relaxed condition.

Various degrees may be observed, viz. :—

1. The fundus is depressed, a cup-like cavity being formed.
2. The fundus passes to the anterior part of the os uteri, the entire body of the organ participating in the displacement.
3. The fundus and body pass out of the vulva, the vagina then undergoing partial inversion.

In surveying the records of obstetric practice in the veterinary profession, one can scarcely realise the little progress made in regard to the methods used for retaining the returned organ in position. How painful to read in our periodicals of the methods used in this particular accident!

Sir Halliday Croom, Professor of Midwifery, Royal Infirmary, Edinburgh, said that the obstetrician should be the cleanest man on God's earth. Doubtless the veterinarian has done his best to attain to this high ideal, but can our profession claim to be the humanest of obstetricians? When we consider the methods used to-day by some for the replacement and retention of the uterus in position, I fear we fail to attain the high ideal of humanitarianism. It certainly does not reflect credit on us to use means or instruments unnecessarily as is frequently done in this connection. Our periodicals record cases of eversion of the womb which after replacement was held in position by steel clamps. Our instrument makers' catalogues often include such instruments of torture for sale in the shape of vaginal clamps with steel prongs.

Undoubtedly many prongs piercing living tissue must cause severe pain. Cases are recorded in which vaginal clamps remained *in situ* for periods up to 13 months.

During long experience in an extensive country practice I have treated scores of cases of eversion of the womb in the cow and a few in mares, with highly satisfactory results and without resorting to the use of clamp or truss of any description. One or two cases in the cow which I recollect this moment may be mentioned :—

CASE 1.—A cross shorthorn cow everted womb about 10 a.m. on Friday. On my arrival late Saturday evening, I found the animal in a state of collapse. The organ was replaced and the cow made a good recovery without any mechanical means to retain the uterus in position. She had several calves afterwards.

CASE 2.—A polled cow with eversion of womb. The case was treated by the cattleman, who supposed he had returned the entire organ into position, but was unsuccessful. On arrival I found the cow straining badly with the fundus of the uterus protruding into the vagina.

Being about two days in this condition, considerable difficulty was experienced in returning the organ into its normal position, but when accomplished, the straining ceased and the animal soon regained her usual health. Again no clamp was used.

When the womb is properly replaced with due antiseptic precautions it is quite unnecessary to use any instrument. Indeed, it constitutes cruelty to animals to use such drastic and useless measures on organs which at this stage are in a highly sensitive condition.

TWO INTERESTING CASES OF ANIMAL INTELLIGENCE.

BY W. WALLIS, M.R.C.V.S.
(*Barnet.*)

BIRDS, especially pigeons, will, as we all know, find their way back home from places scores of miles away, and one frequently reads of animals who have done remarkable things in this direction.

The following two have come under my personal observation, and as I can truly vouch for them I think that they are worth placing on record.

A pony, 25 years old, which had been on a neighbouring farm ever since it was a yearling, was lent to a relative at Broxbourne (about 15 miles off), and it was taken there by road, a journey which it had only made five or six times. Some four months later I was surprised to see the animal standing in the road outside the gate, waiting to be admitted. It had come by itself, and evidently, from the condition of the coat, at a good pace. Upon opening the gate it at once went into its accustomed place in the stable.

The second case was that of a cat, bred on the same farm as mentioned above, which was given to a friend to take to his home some 12 miles away. It was placed in a sack and taken away in the back of a motor car, so that it could not have seen anything of the route during the journey. To the owner's surprise the cat walked into his house a fortnight later, it having found its way and returned alone, the distance between being a very rough cross-country journey.

The return of the horse did not surprise me very much, but the case of the cat has given me much food for reflection upon its sagacity.

Parliamentary.

FOOT-AND-MOUTH DISEASE.

MR. HURD asked the Parliamentary Secretary to the Ministry of Agriculture whether he could report progress on the experiments in this country for the treatment and prevention of foot-and-mouth disease; and whether inquiry is being made into the success which has attended new methods recently practised in Italy?

The Parliamentary Secretary to the Ministry of Agriculture (SIR ARTHUR BOSCAWEN): The Committee now investigating foot-and-mouth disease has not had sufficient time to make progress which would justify a report. The veterinary officers of the Ministry are aware of the attempts made in France, Italy and Switzerland to combat foot-and-mouth disease by serum treatment and vaccination. The results are not promising, however, owing to the fact that effective serum and vaccine cannot be produced until a method of artificially cultivating the virus has been discovered, and it is to this end that the Committee propose to devote most of their energies.

MR. HURD: Has the right hon. gentleman's attention not been called to this recent successful experiment in Italy, and will he call for a report as to these experiments, which are of most vital importance to the herds of this country?

SIR A. BOSCAWEN: I will call the attention of the Committee to the matter to which the hon. gentleman refers.

MR. LAMBERT: Can the right hon. gentleman give the farmers of the country any information as to the cause and where the infection comes which causes these sporadic outbreaks of foot-and-mouth disease?

SIR A. BOSCAWEN: I should be only too glad if I could, but that is the very point which this Committee is investigating. To give partial information before we have their report would be, I think, only misleading.

MR. HURD: Is it not a fact that 15 months ago the Board of Agriculture turned down the suggestion that they should make tests of the same kind that have now been made with such remarkable success?

SIR A. BOSCAWEN: I think we must wait for the report of the Committee.

Correspondence.

THE RAT PROBLEM.

To the Editor of THE VETERINARY JOURNAL.

SIR,—In the October issue of THE VETERINARY JOURNAL there appeared a letter under the above heading addressed to you by Mr. W. Rodier, of Melbourne, Australia, a copy of which he was good enough to forward to me, accompanied by several printed pamphlets, together with a further letter in which he directs my attention to certain statements in a booklet prepared by me entitled "The Rat Problem," an extract from which appeared in last February's issue of THE VETERINARY JOURNAL, and to which he takes exception. With your permission I will confine myself to the statements he refers to as being misleading. In reference thereto he states: "He refers to my system of rat destruction and says 'Rodier claims by the present methods more males are caught than females.'" This is not so and is misleading, as he should have added, "in proportion to the numbers of each sex born, or where the rats are in equal sexes." As a matter of accuracy, it should be pointed out that after the word "females" my sentence was completed with the following:—"With the result that those not caught live in a polygamous state." Assuming it to be correct, as Rodier states in the printed pamphlet he sent to me; and which is similar to the one from which I quoted, namely, "that the rats are at present polygamous and have been for hundreds of generations; that this causes more females to be born than males, and that consequently more are likely to be caught," then the words, "in proportion to the numbers of each sex born," might with advantage have been added as an explanation. In Rodier's printed pamphlet appears the following statement:—"A good many people no doubt will say that I am wrong when I say that more males are killed than females, and that the plans at present in use kill more females than males, and will back this statement up by giving the numbers that are caught, showing that more females are caught than males." Then he goes on to explain by figures and concludes by stating:—"Under these circumstances, although more females are killed than males, the rats actually increase because a lesser proportional number of females are killed than males to the numbers of each sex born." But he continues by making the following statement, namely:—"Now, the difficulty is to find out what are the numbers born of each sex, and that can only be found out by experimenting in enclosed areas." In another part of his pamphlet he states:—"Now, I am fully aware that a great many people will ridicule this plan, and say it is not so, but I wish to say to them that I have proven this plan to be an absolute and positive certainty with the rabbits in Australia over an area of 64,000 acres . . ." Then he says:—"Now, I don't say that I have proven it with the rat, as I am not in a position to do so, etc." Bearing in mind Rodier's admissions, the following statement in my pamphlet does not appear unreasonable, namely:—"Before considering the application of any such scheme, however, it would be desirable that the probability of its success should be thoroughly investigated not only be specially-designed experiments, but also as to whether its application could be properly maintained throughout the country. In the latter part of his letter Rodier states, in referring to my remarks:—"Another misleading statement is where he says "again, it would be equally essential for all districts to be operating continuously in the same direction, otherwise, having regard to the migratory habits of the rodents, the scheme would be hopeless." "I take exception to these remarks and say it is not so, and ask him how he knows this." I think it only fair to state that I believe Mr. Rodier has completely misunderstood my remarks. I see no reason to make any alteration whatever. My remarks apply to this country only, and when I refer to rats being migratory, I am referring to their well-known habits of wandering—commonly in large numbers. How I know this is by personal observation extending over many years. As a matter of fact, the wandering or migratory habits of rats in this country is common knowledge. To repeat, supposing one took as an example an area consisting of several towns and cities in close proximity to one another, and surrounded by open country, with farms distributed here and there and then put Rodier's scheme into operation in any one of the thickly-populated towns within the area, although the scheme so far as its methods are concerned might be a correct one, the probability of its success would be almost hopeless, owing to the fact that new supplies of females would be forthcoming from the adjacent towns (within the area) where the scheme was not in operation. That would appear to be a perfectly good reason for my stating that it would be essential for all districts to be operating continuously in the same direction. Nevertheless, it would be interesting to have such a scheme tested by experimental inquiry. Were such shown by some recognised authority to be capable of bringing about the desired effect if universally applied, it would still remain necessary to obtain—by compulsion or otherwise—absolute co-operation by the public in every district within the kingdom, and which would have to be maintained, not forgetting the new supplies of rats arriving at our ports from abroad.—I am, Sir,

Yours faithfully,
THOMAS PARKER.

Town Hall, Newcastle-upon-Tyne.
October 15, 1920.

Personal.

AMONGST a long list of our French *confrères* who have recently received high honours at the hands of their Government we notice the following, whose names will be familiar to many of the profession in England:—

Legion d'Honneur. Prof. Leclainche (Commander); Professors Nicholas and Lendrail (Chevaliers).

Ordre de Mérite Agricole. Profs. Cadiot and M. Victor Drouin, D.S.O. (Commanders); Inspector-General Fray, C.M.G., Professors Martin and Pavisset (Officers).

By the death of M. Joly the veterinary profession of France has lost a distinguished member, whose name and writings were well known.

For many years he had occupied the position of Veterinary Officer to the well-known Cavalry School of Saumur.

The Second International Congress of Comparative Pathology is to be held at Rome in April, 1921, under the Presidency of Prof. S. Perroncito, late Director of the Royal School of Veterinary Medicine attached to the University of Turin. Amongst the papers already suggested for discussion are influenza in man and animals, rabies, cancer, diseases of cattle, poultry and bees, various parasitic affections and nerve regeneration. The joining fee is only 40 lires, and arrangements will be made to facilitate the journey by the granting of specially reduced fares. The Secretary-General is Professor Mario Levi Dell Vida, 58, via Palermo, Rome, and the Secretary for the English Section is Professor Nuttall, F.R.S., Modingley Road, Cambridge.

Capt. H. B. Collett, R.V.Sc. (Toronto), M.R.C.V.S., a recent graduate of the London College, has recently been attached to the staff of the Ontario University Veterinary College, Canada.

THE French Government have recently awarded the "Medaille (en Argent) de la Reconnaissance Francaise" to Lieut.-Col. T. Dunlop Young, O.B.E., M.R.C.V.S., D.V.S.M., as a recognition of the assistance he and the officers of No. 23 Veterinary Hospital gave to the agriculturists and farmers in the district around St. Omer during the war.

THE FORMATION OF AN OLD COMRADES' ASSOCIATION OF THE ROYAL ARMY VETERINARY CORPS.

A VERY successful meeting was held on Friday evening, December 10, 1920, at the Royal United Services Institution, for the purpose of forming an Old Comrades' Association of the Royal Army Veterinary Corps.

Over 200 past and present members of all ranks of the R.A.V.C. were present.

MAJOR-GENERAL BLENKINSOP, C.B., D.S.O., addressed the meeting as follows :—

"You have been invited here this evening in order to consider the formation of an Old Comrades' Association of the Royal Army Veterinary Corps. It may be asked why an Old Comrades' Association should be formed. For this reason: Practically every regiment or corps in the British Army has got its Old Comrades' Association, and I see no reason why the R.A.V.C. should be behind, especially considering the good work and the great name it gained for itself in the war.

In the war you did better than any other veterinary corps in any previous campaign, or, for that matter, better than any other veterinary service in Europe in the late war.

After its good work came the period when the Army was being dispersed; a very trying time, and those in the Corps at that time did exceptionally good work. As you all know, you took over the sick horses and the surplus animals at the time your comrades were being demobilised, leaving you, their old comrades, to dispose of these animals; and I am glad to say it was a period during which the greatest credit is due to the R.A.V.C. We can congratulate ourselves on being the only Corps which had no regrettable incidents at demobilisation. Our men stuck to their work and held together, and our officers were able to call on them to do whatever was necessary.

This increased work was only accomplished through the good fellowship and good comradeship which existed throughout the Corps; and having gained this good name in the war, and when you were serving, it would be a thousand pities if it were not maintained in civil life; and for that reason, if for no other, the Corps should form an Old Comrades' Association.

I have been asked to explain some of the objects of the Association such as we are proposing to form.

(1) To foster *esprit-de-corps* amongst all ranks, serving and retired, of the Royal Army Veterinary Corps.

(2) To have branches throughout the various T.F. areas and other centres: these branches to hold quarterly meetings and an annual re-union, where we hope old members of the Corps will meet together.

(3) To circulate information regarding the Corps to past members of the Corps.

(4) To recommend the Corps to eligible young men who are desirous of joining the Army. We want past members to assist us in getting a good stamp of young men to come forward for the regular Corps and also for the T.F. It is very important that we should get good material to carry on the good name which you fellows have already gained.

(5) To assist deserving members on leaving, or who have left the Corps, to obtain employment. If the Association is properly organised it will do a great deal to assist those deserving cases who have fallen on hard times and also help greatly the men who are leaving or have left the Corps. Most of us have been connected with animals, and the passing of the horse and the introduction of motor traction makes it difficult for those whose business is connected with the horse to find employment.

(6) We have in the Corps a Benevolent Fund, and we hope if the Association is formed it will be able to bring deserving cases to the notice of the Fund, in order that they may be assisted. We have not money enough to assist everybody. If men are down and want help, a certain amount of money is there and we shall disperse it to the best advantage and to the most deserving cases. These cases are very difficult to find, but the Association will be in a position to find them.

(7) Another object of the Association is to ensure as far as possible decent interment to any member whose family is not in a position to provide it. It is hoped that this will not often be necessary, and that our men may never die, but merely fade away.

MAJOR-GENERAL SIR FREDERICK SMITH then proposed :—

> "That an Old Comrades' Association for the Royal Army Veterinary Corps be started forthwith."

He said that the objects of the Association must appeal to all of us. *Esprit de corps* would be fostered if we could bring together old comrades, both commissioned and other ranks. He considered that of all the objects mentioned, the endeavour to find employment for those who had borne the heat and burden of the day appealed to him most, and he hoped that some serious work would be done in that direction. He felt too that the more deserving cases could be more easily enquired into through the facilities afforded by the periodical meetings of old comrades. He therefore had much pleasure in proposing the formation of the Association.

R.S.M. WARBURTON, speaking as one of the earliest members of the Corps, seconded the proposal, which was carried unanimously.

MAJOR F. G. T. HOBDAY proposed that the Director-General, R.A.V.C., be the President of the Association. He, Major Hobday, considered that no one could know better the ways and means of utilising an Association of this kind. The Director-General would always be the hub to which members would converge. By his election we would be doing the right thing, particularly the right thing on this occasion. The distribution of the benefits of this Association could not be in better hands.

LIEUT.-COL. WADLEY seconded the proposal, which was carried unanimously.

The following officers were unanimously elected Vice-Presidents :—

Major-General H. Thompson, C.B.
Major-General Sir F. Smith, K.C.M.G., C.B.
Major-General Sir R. Pringle, K.C.M.G., D.S.O.
Colonel W. B. Walters, C.B.
Lieut.-Col. R. C. Cochrane, C.B.E.

Major Campey was elected as Hon. Treasurer and R.S.M. Carr as Hon. Secretary.

The following were elected a Provisional Committee :—

As Ex-Officio Members :—

D.Ds.V.S. Home Commands,
A.Ds.V.S. Home Commands.
D.A.D.V.S. London District.
D.A.D.V.S. Territorial Divisions.
The Officer i-c. Records, R.A.V.C.
The Assistant Director-General.
O.C. Depot, R.A.V.C.

As Members :—

Lieut.-Col. G. C. O. Fowler,
Colonel Kay Lees,
Lieut. Hines,
R.S.M. Batts,
W. S. King, Esq., M.B.E.,M.R.C.V.S.
Capt. Davis, M.B.E.,
Major Hobday, C.M.G.
R.S.M. Warburton.
Lieut. Sutton, M.B.E.,
Mr. Standley,
Mr. Horsfield,
Mr. Fisher,
Mr. Henderson,
Mr. Willie,
Mr. Dalrymple Hay,

The sum of 5s. was agreed to as the annual subscription, and it was agreed to arrange a dinner and re-union at an early date.

General Blenkinsop, in thanking everybody for attending the meeting and for the successful way it had been carried out, said he was sure we should have one of the most successful Old Comrades' Associations in the British Army.

NOTICES.

All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C.2. Telephone: Gerrard 4646. Telegrams: "Baillière Rand, London."

Letters for the Journal, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editor.

Manuscript—preferably typewritten—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown ink on white paper or card.

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MAJOR-GENERAL SIR LAYTON J. BLENKINSOP,
K.C.B., D.S.O., F.R.G.S.,
Director-General, Royal Army Veterinary Service.

THE
VETERINARY JOURNAL

Editor:
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HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING.
OFFICIER DU MERITE AGRICOLE (FRANCE).
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HONORARY MEMBER OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION.
AND FORMERLY PROFESSOR IN THE ROYAL VETERINARY COLLEGE, LONDON.

Sub-Editor:
GLADSTONE MAYALL, M.R.C.V.S.

FEBRUARY, 1921.

MAJOR-GENERAL SIR LAYTON JOHN BLENKINSOP, K.C.B., D.S.O., F.R.G.S.

THE Veterinary profession, and especially the Royal Army Veterinary Corps, will heartily congratulate Major-General Sir Layton J. Blenkinsop on the honour of Knighthood conferred in the New Year's Honours List. Born in 1862, the third son of Lieut.-Colonel Blenkinsop, our distinguished colleague graduated from the Veterinary College (where he gained the Coleman Medal) in 1883, and at once entered the Army, being sent to India the same year. Remaining there until 1893, Lieut. Blenkinsop occupied many important positions, including those of Veterinary Advisor to the Punjab Government and Professor of the Lahore Veterinary College. In 1898, being then in Egypt, he was appointed Senior Veterinary Officer to the Soudan Expeditionary Force, being present at the battle of Khartoum. For his services he was awarded the D.S.O., being mentioned in despatches and receiving the Egyptian Medal and the English Medal.

On the outbreak of the South African War of 1899-1902, as a Captain and Senior Veterinary Officer of the Cavalry Division, and eventually of Remounts, he was present at the relief of Kimberley, the battles at Paardeburg, Dreifontein, Diamond Hill and many others in Cape Colony, Orange Free State and Cape Colony.

For these services he received the Queen's Medal with six clasps, and the King's Medal with two clasps, being again mentioned in despatches and being promoted to the rank of Major.

Returning to England, Major Blenkinsop was made Principal Veterinary Officer of the Irish Command from 1904 to 1906, being then again sent to South Africa, this time as P.V.O., a position he occupied until 1909. Called back to England, he occupied several high commands until 1914, when he was sent to India as Inspecting Veterinary Officer with the rank of Colonel until, in July, 1916, he was selected to fill the post of Director of Veterinary Services. A further honour awaited him in December, 1917, when, as Brigadier-General, there fell to his lot the well-deserved promotion to the highest position of all, that of Director-General of the Royal Army Veterinary Service at the War Office in London.

For services rendered during the Great War of 1914-1919, a Major-General's rank was accorded, together with a C.B., and a further mention in despatches.

Major-General Blenkinsop's military career has been a brilliant one, but in other branches of the profession his services have always been to the fore and given ungrudgingly. On educational matters his views have always been progressive, both as regards the student and the practitioner, and he has contributed numerous articles to the Veterinary Press. At the present moment as an energetic member of the Council, he has shown himself to be a man of strong convictions, and that he is popular with his professional *confrères* there is evidence in the fact that he was recently unanimously elected President of the Central Veterinary Medical Society.

May he have long life to enjoy, with Lady Blenkinsop (whose name is already well known for good work done in connection with the R.A.V.C. Comforts and Benevolent Fund), the well-deserved honours which have fallen to his lot.

Editorials.

IMPROVEMENT NEEDED FOR THE TRANSPORT OF MEAT IN THE CITY OF LONDON.

In a further column we give an abstract from the joint report of the Veterinary Inspector and the Medical Officer of the City of London, in which the question of the transport and handling of meat intended for human food is dealt with in phrases which show that there is very great room for improvement. In fact, it is with surprise that we read how carelessly and even filthily this is carried out. To think that in 1920 the Medical Officer of Health of the largest and richest city of the world should have to complain that meat intended for the food of the citizens of London is "deposited on the footway," on the pavement of which "there is considerable fouling of the surface by blood and particles of fat, etc., which are trodden into a hard layer mixed with street refuse," and that "the sectioning of meat results in large areas of muscular tissues being exposed, and, as the cut surface is moist, dust (fouled by the large numbers of horses which stand about) settles upon it, and the further risk of contamination by animals is obvious."

Carts are only washed occasionally, and straw, without cloths, is not a suitable thing on which to place meat intended for human consumption.

On one occasion a dog was seen in a cart in which uncovered joints of meat were lying, and frequently men whose boots were soiled with road dirt got into the carts and trod over the place where the meat was afterwards deposited. On several occasions they even trod on the meat itself. The want of cleanliness on the part of the porters who carried the meat both in regard to their overalls and their caps is especially alluded to.

The subject is dealt with in detail in the report, and it shows a state of affairs which is very unsatisfactory, and which should be remedied without delay ; for of what use is it to provide an efficient and clean meat inspection service inside the meat market when the goods are open to filthy contamination by being dumped down on a dirty pavement, carried on dirty shoulders and in dirty carts, and then taken, uncovered or improperly covered, to the retail shops for sale to a deluded public, who imagine that they are purchasing a pure and clean article. It is only on account of the English habit of cooking our food well that we escape scores of diseases of which our meat would be the carrying agent.

EXTINCTION OF THE PHYSIOLOGICAL RESEARCH LABORATORY OF THE UNIVERSITY OF LONDON.

Most practising members of the profession have at one time or another been attracted by some particular problem in animal pathology or physiology to which their clinical observation has given an answer that only needs experimental confirmation. It may have been a comparative simple matter that could have been solved by a few hours' work, but the difficulty of finding a laboratory in which to conduct their experiments has been insurmountable, and the problem and its nascent answer have been reluctantly abandoned. The schools and colleges of London possess laboratories which are primarily designed for the instruction of students, such resources as they may have for research work are necessarily subordinated to the needs of teaching, and their staff have little time or accommodation to offer to the post-graduate worker. It was with the object of providing an institution which should be free to all competent workers who had a problem to investigate that, some seventeen years ago, Professor Waller founded the Physiological Laboratory of the University of London. The laboratory was equipped by the aid of a generous donation from the members of Mrs. Waller's family, and some rooms assigned to it in the building of the University. Professor Waller gave his services, and was assisted by a competent staff. Any genuine worker was welcomed, the resources of the laboratory were unreservedly placed at his disposal, and such aid and advice as he might require was tendered by the director and his staff.* No fees were demanded, and the worker was free to come and go in such intervals as he could spare from his professional duties. It would be difficult to imagine a more valuable institution more economically carried on, and the total expense was only £1,300 a year, of which £800 was contributed by the University of London, and £500 by the London County Council. But £800 represents an amount which can be utilised towards the salary of one of the higher officials of the enormous clerical staff that the University supports, and it is proposed to devote the rooms now used as laboratories for the storing of office files of the dreary documents that the bureaucratic machinery of the University accumulates; even before the war the University expenses in printing them were £2,000 a year. The burden of bureaucracy is not confined to Whitehall, and therefore the laboratory has to go. Some three years ago the beautifully equipped lecture room was converted into an office for women clerks and covetous eyes were cast on the remaining accommodation. The £500 a year grant of the London County Council was an obstacle to the extinction of the laboratory, but the Council were asked (and consented) to transfer their grant to the general fund of the University, which thus became the sole paymaster of the Laboratory. Now the Senate have decided to withdraw all financial support from the laboratory and require its removal from precincts henceforward to be handed over to the typewriter and the office file. For those who, without pay or encouragement, have given their time to research work, and who had this splendid laboratory to work in, it is a heavy blow. The real significance of this calamity is, however, far greater—it means the death of a great idea which might have been prolific of much. The medical or veterinary post-graduate who has paid his fees and passed his examinations has still a claim on the University. He has the right to turn to it and ask for opportunities to enlarge his knowledge and that of his profession, not only by reading books or listening to lectures, but by his own personal work. How does the University intend to meet this demand ? It proposes to spend some millions on a superb block of new offices in Bloomsbury, and it closes the only University laboratory in London devoted solely to private physiological and pathological research.

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* Much valuable help in the discovery of a safe method of chloroforming dogs for operations and painless destruction has been acknowledged by the Author of "Anasthesia and Narcosis of Animals and Birds" to Professor Waller and Dr. Symes; to the former of whom this book (which is the only British text book on the subject) is dedicated.

A FURTHER APPRECIATION OF THE ROYAL ARMY VETERINARY CORPS.

In a further column we publish an extract from the Despatch of the General in Command of the British Army of the Black Sea, in which the work of the Royal Army Veterinary Corps is alluded to and gracefully acknowledged with the name of the Chief Veterinary Officer.

It is of particular interest just now, as it is particularly in connection with work done under the Remount Services, and proves again the impossibility of the latter service to work effectually and efficiently without the help of proper veterinary supervision.

The Veterinary Service could adequately carry out *all* the Remount Duties and thus save the country and the taxpayer much expenditure by preventing duplication of officers, but the Remount Service could not keep its animals in health and fit for duty without skilled veterinary advice.

Why, then, should not the whole question of purchase and selection of horses and their maintenance in health and disease be handed over to the Veterinary Service ? It is time this was given serious consideration.

The following is an extract from the Despatch by General Sir G. F. Milne, G.C.M.G., K.C.B., D.S.O., Commander-in-Chief, the Army of the Black Sea, published as the Fourth Supplement to the *London Gazette* of Tuesday, January 4, 1921 :—

General Headquarters, Army of the Black Sea,
Constantinople. August 11, 1920.

Sir,—I have the honour to forward for your information the following account of the action taken by me and by the troops under my command from the date of the signature of the Armistice with Turkey to the date of the signature of the Turkish Peace Treaty (August 10, 1920).

"All surplus animals have been disposed of under arrangements made by my Director of Remounts, Brigadier-General G. W. Dowell, C.M.G., C.B.E. Approximately 5,000 horses and 17,000 mules brought in prices which averaged £50 and £42 respectively. The fact that such prices were obtained was largely due to the splendid condition of the animals, thanks to the conscientious work of the Royal Army Veterinary Corps, under Lieut.-Colonel W. A. Jelbart."

AN AMERICAN TRIBUTE TO THE ROYAL ARMY VETERINARY CORPS.

THE *Boston Evening Transcript* has recently devoted a whole page to the subject of "Our Animal Allies in the Great War, Horses and Mules," and in the fourth lecture, given by Mr. E. H. Baynes, at the request of President Lowell, of Harvard University, this clever and deservedly popular lecturer generously praises the good work done during the late war by the British Veterinary Corps. The lecture was illustrated by over 120 lantern slides, and drew a large and sympathetic audience. Mr. Baynes gave realistic descriptions of the conditions under which the animals lived and worked at the Front, and then went on to describe what was done for them when sick and incapacitated. Photographs of life in a British Veterinary Hospital, of operations under chloroform, of sick patients, and convalescents ready to be returned to the Field again, and the general working of the Veterinary Service, were thrown on the screen in such a way that the audience could almost imagine themselves on the actual spot, and due tribute was paid to the work done in regard to its value, both from the humane and the pecuniary aspect.

At the beginning of the world war the British Veterinary Service was practically perfected, and all it required as the war developed was expansion. The English remount and veterinary services were declared the best in the world, and especial emphasis was drawn to the fact that all horsed units had a veterinary sergeant, under the direct orders and supervision of a veterinary officer, attached for first aid work before despatching to the mobile section and, finally, the hospital. To quote the actual heading under which these two latter paragraphs appeared, the Editor of the paper has it in large type that the "English Service led the World."

Mr. Lowell remarked upon the great losses which occurred in the animals of the American Army at the commencement, and, indeed, until the Veterinary Service was remodelled on British lines, especially drawing attention to the stupid system which previously existed of having a veterinary hospital in connection with a remount camp. Contagious and other diseases could not help but spread to the healthy horses and mules under such conditions, and tens of thousands of dollars were wasted whilst this system existed. It was just another instance of the folly of permitting lay authority to control in matters of professional import, and this late war has demonstrated more than any other that the old adage of " Every man to his own trade " is a true one, and the only one by which victory could possibly have been attained.

General Articles.

MEAT INSPECTION IN THE CITY OF LONDON.

Abstract from Report.

By Lieut.-Col. T. D. YOUNG, O.B.E., M.R.C.V.S., D.V.S.M. (Lond.),
Veterinary Inspector and Chief Meat Inspector for the City of London.
Prefaced by Some Remarks on "Meat Handling,"
By Dr. HOWARTH, C.B.E., D.P.H., M.O.H. City of London.

Handling of Meat.—It often happens that the supply arrives at the carts more quickly than it can be packed, and, as a consequence, it is allowed to stand about on the trucks for a longer time than is desirable. During this waiting period the meat is sometimes deposited on the footway. It should be noted that the sectioning of meat results in large areas of muscular tissues being exposed, and as the cut surface is moist, dust readily settles on it with the resulting disadvantages which are common to dust deposition ; dust is excessive in dry weather, as the streets in the loading-up areas are fouled by the large number of horses which stand about. As regards the pavement, I need only mention that there is considerable fouling of the surface by blood and particles of fat, etc., which are trodden into a hard layer mixed with street refuse. The further risk of contamination by animals is obvious.

I have had occasion officially to complain of one more than usually gross instance of piling meat on the ground. In this case the meat was separated from the wet ground by a layer of coarse sacking, the edge of the cover being also practically flush with the sides of the pile. The surroundings were foul.

As regards the carts, the general practice is to cover the bottom of the cart with straw. In other cases a kind of sacking is used with or without an under layer of straw, and in exceptional cases white calico or some similar matter is used. Some of the carts do not come to the market in a thoroughly clean condition. They are certainly washed at times, but not every day. The straw may be clean, but it is not a suitable material on which to place the cut sections of meat. The cloths I have seen used day after day, being washed, in some cases, not oftener than once a week. Blood-stained cloths should be washed before being used again. White cloths are more desirable, as staining and dirt readily show and this results in greater care being displayed.

The procedure during packing is open to criticism. I have often seen, even on wet days, men, whose boots were soiled with road dirt, get into the cart to fill the front part. In doing so they soil the straw or cloth at the rear and on this soiled part meat is afterwards laid. If a white cover were used this would probably be rolled up at the back, whilst the front was being packed, and it would be straightened out as the packing progressed.

I have seen a dog in a cart in which uncovered joints of meat were lying, and the dog would have been driven away in the cart if I had not objected. My protest in this and other cases was received badly. This is simply mentioned as an instance of disregard of an obvious precautionary essential.

I have seen men stretching over uncovered meat to reach the front of the cart, and in exceptional cases have seen them with their feet on it. I have also noticed at times meat soiled with roadway dirt.

As regards the transfer of meat from the stalls to the cart, I take exception to the infrequency of change of overalls by the porters, and to meat being carried on a man's head when he is wearing a cap which has done duty for weeks without being washed.

Meat is not allowed to be placed on the floor of the stalls inside the market, and practically every trader has slightly raised wooden benches. There are no such facilities outside the market, nor are there any powers to require them to be provided.

It seems strange that whilst in the slaughterhouses due regard *must* be paid to the observance of cleanliness, and in the markets the traders recognise the advantage of cleanliness and order, and further, that butchers at their shops encourage brightness and cleanliness, as is evidenced by good lighting, clean benches, bright brass and steel fittings, and clean-looking tiles to line the shop, so little regard should be paid to the elementary rules of cleanliness in the interval which elapses between purchase from the wholesale dealer and the reception of the meat at the shop.

I beg to repeat the recommendations which I have previously made:

1. Carts and vans used for the removal of meat should be thoroughly cleansed after use.
2. When used for the removal of meat, the floor of the vehicle should be covered with some suitable washable material, preferably white or grey in colour. Straw is an unsuitable material to use unless covered with some suitable fabric.
3. A clean cloth should be used to protect the meat from coming into contact with the sides of the cart, and also to cover the top of the consignment.

4. The surface of the meat should not come into contact with any tarpaulin, and tarpaulins should be kept in as cleanly a state as possible.
5. No driver should be allowed to sit on a consignment of meat even if the meat is adequately covered.
6. The various joints of meat should, as far as may be practicable, be covered on the cut section with grease-proof paper.
7. It would be an advantage if sides of beef were covered with a layer of some material similar to that used for imported meat. This would avoid soiling by the clothing of porters, who cannot prevent their overalls being fouled in the course of a morning's work.
8. In the transfer of meat from the stalls to the vans, meat should not be allowed to rest on the uncovered head of the porter, nor on the cap which he regularly wears. A washable head-cover should be used by those men who have to carry such large amounts that the meat must touch the uncovered head.
9. Meat should not be placed on the ground whilst waiting to be packed in the cart, even though a covering has been first put down to receive it.
10. Wet offal should not be placed in contact with quarters, sides, or other portions of meat without adequate protection against soiling by the moisture exuding from the offal.

I am informed that the whole question of the transport and handling of meat is under the consideration of the Ministry of Health.

The supplies deposited for sale within the Central Markets, Smithfield, for the year ending December 31, 1919, as shown by the Annual Report of the Market Superintendent, were as follows:—

Source of Supply.	Tons of Beef and Veal.		Tons of Mutton & Lamb.	
	1918	1919	1918	1919
United Kingdom ...	49,456	66,260	24,590	23,186
Australia and S. Africa ...	4,656	11,724	16,622	47,166
South America	23,953	68,362	8,493	16,364
North America	50,145	28,265	38	69
Other Countries ...	10	343	1	...
TOTALS	128,220	174,954	49,744	86,785
1913	...	231,811	...	138,614

Source of Supply.	Tons of Pork & Bacon.		Tons of Poultry, Game, &c.		Tons. Totals.	
	1918	1919	1918	1919	1918	1919
United Kingdom ...	2,648	1,902	13,838	15,431	90,532	106,779
Australia and S. Africa...	6	16	5,351	4,343	26,635	63,249
South America	147	1,195	274	138	32,867	86,059
North America	6,786	4,752	2,807	4,350	59,779	37,436
Other Countries ...	15	11	1,25	1,169	1,277	1,523
TOTALS	9,605	7,876	23,521	25,431	211,090	295,046
1913	...	35,634	...	26,052	...	432,111

General Remarks.—The quality of the imported meat passing through the Market has been "very fair," but "condition" has caused a considerable amount of extra work to the inspectors. Those remarks apply chiefly to mutton. Under "Control," only arranged quantities of each class of food were marketed daily. This resulted in quantities of mutton, which in normal times would have been marketed with all its bloom, arriving in the market cold stores, etc., in a mouldy and decomposing condition, necessitating careful examination, much "trimming," and also increased condemnation. The practice of cutting carcases of mutton into two portions and enclosing the one within the other, has added to the amount of meat condemned; no doubt in time this practice will cease, to the benefit of the consignors. Bacon also gave the inspectors extra work, and large quantities of this food were found unfit for human consumption, while much of it, passed as fit for food, was far from being satisfactory.

The meat derived from the United Kingdom was not generally of so high a quality as in pre-war years. This was due to a number of causes, but chiefly to the fact that animals were graded and sold at a fixed rate according to grade, and as feeding stuffs were costly there was no inducement to farmers to produce exceptionally high quality cattle.

The foregoing conditions are the aftermath of the war, and as more normal conditions return, we may expect better "quality," better "condition," and more food supplies at the markets.

TUBERCULOUS MEAT SEIZED AT THE CENTRAL MARKETS DURING THE YEAR 1919.

	BEEF.			PORK.			VEAL.		
	Cars.	Qrtrs.	Pces.	Cars.	Qrtrs.	Pces.	Cars.	Qrtrs.	Pces.
1919	133	783	114	99	...	13	13	...	2
1914	12	79	91	431	19	61	3	...	2
Increase	121	704	23	...	...	...	10	...	...
Decrease	...	...	...	332	19	48	...	...	...

OFFAL.

	Heads.	Tongues.	Lungs.	Hearts.	Livers.	Stomachs.	Spleens.	Mesenteries.	Intestines.	Kidneys.	
1919	260	212	123	...	121	11	31	9	9	51	Oxen
1919	190	...	141	...	73	...	6	...	...	...	Pigs
1919	4	...	11	...	7	...	2	...	...	4	Calves
1914	37	53	17	2	12	1	3	1	1	2	Oxen
1914	1,785	...	153	...	160	...	...	37	...	9	Pigs
1914	...	...	1	...	1	...	...	...	...	...	Calves.

Total weight for 1919 = 56 Tons, 11 Cwts., 2 Qrs., 14 lbs.
" " 1914 = 50 " 2 " 2 " 7 "
Increase = 6 " 9 " 0 " 7 "

Of 928 bovines (not including calves) killed at the Aldgate slaughter houses, 24 or 2.4 per cent. were found affected with tuberculosis, and of the 10,644 calves, 39 or 0.3 per cent. showed lesions of the same disease.

SUMMARY OF UNSOUND FOOD DESTROYED.

	Tons.	Cwts.	Qrs.	lbs.
Central Markets, Smithfield	1,668	13	3	13
Cold Stores	261	17	1	3
Leadenhall Market and City Shops ...	83	3	3	7
Aldgate Market and Slaughterhouses ...	55	3	3	5
Total for the year 1919	2,068	18	3	0
" " " 1918	1,709	19	1	17
Increase	358	19	1	11

Unsound Meat.—The meat, etc., seized during the year by your inspectors as unfit for food is classified as under :—

1919.	Diseased.				Unsound.				Unwholesome.			
	tons.	cwts.	qrs.	lbs.	tons.	cwts.	qrs.	lbs.	tons.	cwts.	qrs.	lbs.
First Quarter	109	7	3	27	131	9	1	27	20	11	2	13
Second ,,	44	19	2	7	192	6	1	18	28	17	0	2
Third ,,	31	9	3	3	177	1	0	12	13	15	2	22
Fourth ,,	60	11	0	1	290	4	2	21	35	7	2	3
Total	246	8	1	10	791	1	2	22	98	11	3	12

1919.	Poultry.				Offal.				Fish.				Total.			
	tons.	cwts.	qrs.	lbs.	tons.	cwts.	qrs.	lbs.	tons.	cwts.	qrs.	lbs.	tons.	cwts.	qrs.	lbs.
First Quarter	41	3	3	11	68	1	0	24	4	13	2	21	375	7	3	11
Second ,,	30	4	3	5	127	5	0	10	0	11	2	3	424	4	1	17
Third ,,	41	18	0	24	216	11	2	0	2	1	0	18	482	17	1	23
Fourth ,,	141	2	0	1	194	5	2	3	0	16	1	21	722	7	0	22
Total	254	8	3	13	606	3	1	9	8	2	3	7	2004	16	3	17

CENTRAL MARKETS, SMITHFIELD.

Table showing the average deliveries at the Central Meat Market, and other details for successive quinquennial periods during the past 41 years :—

Quinquennium.	Annual Average General Supply.			Seizures by Inspectors.			% of Unsound Meat.
	Tons.	cwts.	qrs.	Tons.	cwts.	qrs.	
1874-1878	178,373	10	0	192	18	2	·108
1879-1883	218,200	12	3	282	11	2	·129
1884-1888	249,580	19	2	248	1	2	·099
1889-1893	304,986	5	1	461	15	1	·151
1894-1898	372,440	12	2	749	3	3	·201
1899-1903	410,456	18	1	1,082	13	2	·263
1904-1908	414,906	11	1	1,584	19	3	·382
1909-1913	427,146	0	0	1,520	2	3	·356
1914-1918	324,715	0	0	1,370	11	2	·422
1919-	295,044	0	0	2,068	18	3	·7012

Some idea of the amount of the work of your inspectors of slaughter-houses and meat may be obtained from the following figures supplied by the Superintendent of the Market :—

	1915 Tons.	1916 Tons.	1917 Tons.	1918 Tons.	1919 Tons.
Average daily delivery into the Markets	1,220	1,077	922	688	964
*Minimum delivery on any one day	227	139	135	61	107
Maximum delivery on any one day	3,220	2,780	2,397	1,668	2,101
The heaviest weight previously recorded on any one day (22nd December, 1913) was ...			4,398		

* The minimum deliveries relate to Saturdays when practically no wholesale business at the Market is carried out.

The percentages of meat seized under the various headings of the above table during 1919 and for the preceding five years, classed as diseased, unsound and unwholesome, were as follows:—

Year.	Diseased. Per Cent.	Unsound.* Per Cent.	Unwholesome. Per Cent.
1914	10·0	80·0	10·0
1915	11·0	84·0	5·0
1916	13·4	84·1	2·5
1917	8·7	88·9	2·4
1918	10·1	87·7	2·2
Average for 5 years	10·6	84·9	4·4
1919	12·3	82·8	4·9

* Includes poultry, offal and fish.

REPORT UPON A DEMONSTRATION OF THE METHODS OF "STUNNING" ANIMALS FOR SLAUGHTER.

By WM. ST. C. SYMMERS,
Professor of Pathology in Queen's University, Belfast and
JOHN McCLURE BARRY, M.R.C.V.S.,
Veterinary Official to the City of Belfast.

City Veterinarian's Office,
Public Abattoir,
Belfast,
November 15, 1920.

To the Chairman and Members of the
Markets Committee, Belfast Corporation.

MR. CHAIRMAN AND GENTLEMEN,

We beg to report that in accordance with the arrangements made by your Sub-Committee on September 27 and 14th ult., a demonstration of the methods of slaughter of animals for human food was carried out at the Public Abattoir on the 18th ult., the cattle and sheep being provided by the members of the Meat Traders' Association, and the pigs by Messrs. the Irish Bacon Curing Co., Ltd.

For the purpose of this report we will deal with the various animals slaughtered and the method of slaughter adopted.

CATTLE.

Six selected bullocks of uniform age and condition were carefully examined at the abattoir on the morning of the 16th ult., and housed under supervision till the morning of the 18th ult., when they were numbered and placed in the lairage adjoining the slaughter hall where the demonstration was to take place. Two animals were to be stunned by the pole-axe; two by the "humane killer" (Royal Society for the Prevention of Cruelty to Animals), and two by the hammer, which is the instrument in common use in this abattoir for the stunning of horned cattle.

Lots were drawn for the allocation of the animals to be stunned by the various methods.

Bullock No. 1.—Instrument used, pole-axe. The animal was promptly and efficiently stunned at the first blow (prompt and total loss of consciousness), "pithed," and then bled. Interval between stunning and commencement of bleeding, 35 seconds. The animal, on being stunned, fell with limbs extended. A sample of blood was taken at the commencement of bleeding—blood of a bright red colour.

Bullock No. 2.—Instrument used, R.S.P.C.A. killer. (The operation of this instrument was in the hands of an expert employed by the R.S.P.C.A.) The animal was promptly and efficiently stunned; was not properly "pithed," due to non-entry of the cane. Interval between shooting (stunning) and bleeding, 30 seconds. The animal, on being stunned, fell with limbs firmly flexed. Sample of blood was taken at the commencement of bleeding—blood of a dark colour.

Bullock No. 3.—Instrument used, hammer. Animal was promptly and efficiently stunned at the first blow, falling with limbs extended; extension more marked than in animals stunned by pole-axe. Interval between stunning and bleeding, 44 seconds. Sample of blood taken at the commencement of bleeding—blood of a bright red colour.

Bullock No. 4.—Instrument used, hammer. Stunned and bled as No. 3. Interval between stunning and bleeding, 45 seconds. Sample of blood taken at commencement of bleeding—blood of a bright red colour.

Bullock No. 5.—Instrument used, R.S.P.C.A. killer. Promptly and efficiently stunned, "pithed," then bled. Interval between stunning and bleeding, 45 seconds. Animal fell with limbs strongly flexed. Sample of blood taken at the commencement of bleeding—blood darker in colour than that of bullocks Nos. 1, 3 and 4, but not so dark as blood from No. 2 (killed by R.S.P.C.A. killer).

Bullock No. 6.—Instrument used, pole-axe. Promptly and efficiently stunned, then "pithed." The cane did not enter properly. Interval between stunning and commencement of bleeding, 45 seconds. Fell with limbs extended. Sample of blood taken at commencement of bleeding for examination—blood of a bright red colour.

EXAMINATION OF CARCASES.

At 4 p.m. on the same day we examined the carcases of the above-mentioned six bullocks.

The carcases of bullocks Nos. 2 and 5 (slaughtered by R.S.P.C.A. killer) were darker in colour than the others, and not so well "set."

The carcases of all the animals killed to-day were stored during the night (and till completion of examination) in the lock-up cooling hall rented by the Military Authority (in the abattoir).

On the 19th ult., samples of muscular tissue were taken from all the six carcases for examination (inter-costal and lumbar muscles).

The examination of the carcases reveals no change in the appearances described yesterday, save that the difference in the colour was seen much more clearly in the samples of muscular tissue cut from the carcases for examination.

October 20, 1920.

On careful examination all the carcases were found to be well "set," and the condition was the same as on the 19th ult.

October 21, 1920.

At 10 a.m. a marked deterioration was observed in the condition of the carcase of bullock No. 2 (R.S.P.C.A. killer); also, to a lesser degree, in the carcase of bullock No. 5 (R.S.P.C.A. killer); also, to a still less degree, in the carcase of bullock No. 4 (hammer). The remaining carcases (No. 1—pole-axe; No. 3—hammer; and No. 6—pole-axe) were in perfect condition.

The carcases of all six bullocks were issued to the owners this afternoon (21st ult.), after retaining samples of muscular tissue (sterno-maxillaris) (sterno-mastoid) for further observation.

EXAMINATION OF RETAINED PORTIONS.

Samples (No. 1—pole-axe), (No. 3—hammer), and (No. 6—pole-axe) were in perfect condition.

No. 2 (R.S.P.C.A. killer). Markedly deteriorated, decomposition evident, malodorous.

No. 5 (R.S.P.C.A. killer). Markedly deteriorated; dark in colour, not malodorous.

No. 4 (hammer). Slightly deteriorated; not so firm to touch and darker in colour than samples Nos. 1, 3 and 6, but not so dark as No. 5.

October 23, 1920.

The samples present appearances identical with those described yesterday (22nd ult.), save that sample No. 2 (R.S.P.C.A. killer) is still further discoloured, soft and decomposed; sample No. 5 (R.S.P.C.A. killer), decomposition evident; sample No. 4 (hammer), markedly deteriorated; commencing evidence of decomposition.

October 25, 1920.

Samples Nos. 1 and 6 (pole-axe) in good condition.

Samples Nos. 2 and 5 (R.S.P.C.A. killer) badly decomposed.

Sample No. 3 (hammer), markedly deteriorated, but not decomposed.

Sample No. 4 (hammer), showing evidence of commencing decomposition.

October 26, 1920.

Nos. 1 and 6 (pole-axe), sound; all the other samples show marked evidence of decomposition.

EXAMINATION OF BLOOD FROM ABOVE-MENTIONED SIX BULLOCKS.

The shot animals appeared to bleed quite as well as the others, but the blood was most unmistakably darker in hue. As soon as the blood vessels were cut, quantities of the blood were collected from each of the six animals and set aside. It was seen that clotting took place rapidly and normally in the samples from the animals stunned by the pole-axe and hammer, but in the case of the shot animals the dark blood clotted slowly, being a mere soft jelly in an hour's time, and even after 24 hours had elapsed was still soft and uncontracted. Moreover, the quantity of the serum expressed from these dark soft clots was small in comparison with that obtained from the firm red clots of the other animals. Also the scanty serum was much redder in tint (Haemolysis) than the clear amber serum of the animals stunned by the pole-axe and hammer.

The clots were allowed to stand in a cool place for 48 hours, and the quantities of serum obtained were measured. 250 c.c. of blood were taken from each animal with the following results:—

Animal No. 1 (pole-axe), furnished 90 c.c. of serum, clear.
Animal No. 6 (pole-axe), furnished 95 c.c. of serum, clear.
Animal No. 3 (hammer), furnished 95 c.c. of serum, clear.
Animal No. 4 (hammer), furnished 50 c.c. of serum, clear.
Animal No. 2 (humane killer), furnished 10 c.c. of serum, pink.
Animal No. 5 (humane killer), furnished 50 c.c. of serum, pink.

It appears that blood from the shot animals furnishes distinctly less serum than blood from the animals stunned by the pole-axe, distinctly less than blood from one of the animals stunned by the hammer, and an equal amount with the second of the latter. Moreover, the blood of the shot animals furnishes serum more highly coloured (haemolytic) than does the blood from animals stunned by pole-axes or hammer.

SLAUGHTER OF SHEEP.

For the purpose of this experiment, three sheep were shot by the slaughtering expert of the R.S.P.C.A. with a pistol. All these sheep were efficiently stunned in addition, three sheep were slaughtered by the method in ordinary use in the abattoir (division of the great vessels of, and breaking of, the neck), they bled at once most copiously, so that, notwithstanding the absence of previous stunning, unconsciousness very quickly supervened owing to failure of circulation in the brain (cerebral anæmia).

The carcases of the above-mentioned six sheep were kept under observation until 12 o'clock noon on the 21st ult.

No difference whatever was observed in the quality of the mutton in any of these six sheep.

SLAUGHTER OF PIGS.

Pig No. 1.—Shot by pistol (as used for stunning sheep). This pig was shot after the operator had experienced difficulty in obtaining the necessary accuracy of aim. 38 seconds after shooting, the animal was bled in the usual manner. We do not consider that this animal was efficiently stunned. Exaggerated muscular movements persisted for a considerable period. Death resulted 10½ minutes after shooting.

Pig No. 2.—Stunned by wooden globular mallet. The animal was promptly and efficiently stunned at the first blow. Complete loss of consciousness and practically all movement. Bled in usual manner 30 seconds after stunning, died quickly.

EXAMINATION OF CARCASES AT 4 P.M. SAME DAY (18/10/20).

Pig No. 1.—Shot by pistol. The carcase was not well "set." The internal fat "splashed," striped red in patches, indicative of imperfect bleeding. Post-mortem examination of the head revealed that the pig had been shot too low in the forehead ; the brain substance was practically uninjured, save the extreme tip of fore part of the organ. The brain was covered with hæmorrhage.

Pig No. 2.—Stunned by wooden globular mallet. The carcase was well "set." No discolouration. Post-mortem examination of head revealed that the bones of the skull were not fractured. The brain showed no injury visible to the eye.

SUMMARY.

In conclusion we desire to offer a brief summary based on the foregoing details.

Sheep.—As regards the sheep, we found that the keeping quality of the flesh was equally good in all six animals. Three of these were bled without previous stunning, and three were first stunned by the pistol (shot) and then bled. There can be no question that the shot animals were instantaneously stunned, and therefore unconscious. On the other hand, the clean cut of the knife in the unstunned animals was raipdly followed by unconsciousness. The free bleeding almost immediately depriving the brain of blood and consequently producing unconsciousness.

As between the two methods, there is little choice from a humanitarian point of view ; at the same time whatever superiority exists is in favour of the pistol—always provided that the bullet actually pierces the brain.

Pigs.—As regards the pigs. In this experiment we have no hesitation in stating that the mallet was the better of the two methods. The work was more quickly done, the stunning was instantaneous, and, moreover, the flesh of the shot pig was not in so good a condition as the flesh of the animal stunned by the mallet.

Cattle.—Here we have a case of six bullocks—two stunned by the pole-axe, two by the hammer, and two by the R.S.P.C.A. killer (shot).

These six animals were each instantaneously stunned by the method employed, so that as regards the painlessness of their death there was no superiority of one method over the others, but in making a choice it must be stated that the pole-axe was superior to the two other methods, for two reasons:—

1. The flesh kept better.
2. The blood from the animals stunned by the pole-axe furnished the greatest quantity of serum. Also the quality of the serum was for commercial purposes distinctly better than that obtained from the blood of the shot animals, and also better than that from the blood of one of the animals stunned by the hammer.

We beg to add that in the above experiments all the operators were experts in their work, and we believe that the slaughtering of animals should be confined to men who are thoroughly qualified for their responsible duty.

Clinical.

TWO CASES OF ASPHYXIA IN THE HORSE FROM RARE CAUSES, WITH REMARKS ON SPLITTING THE SOFT PALATE AS A MEANS OF DIAGNOSIS, TOGETHER WITH OBSERVATIONS ON TRACHEOTOMY.

By MAJOR-GENERAL SIR FREDERICK SMITH, K.C.M.G., C.B., F.R.C.V.S.

PROFOUND difficulty in breathing, with threatened asphyxia, may arise from many causes. The two cases to be related are most unusual, and both are highly unsatisfactory.

Case 1.—In March, 1888, I saw in consultation a horse which had suddenly been seized with asphyxia, necessitating the immediate insertion of a tracheotomy tube. In the previous November the animal had been under treatment for catarrh and then for lameness, thought to be due to rheumatism. At the date of the consultation there was a discharge from the near nostril, a small quantity of pus streaked with blood being observed. When the tube was closed the horse was threatened with immediate suffocation. Everything in the region of the larynx appeared normal. The animal was cast and a thorough exploration of the fauces and glottis made through the mouth. All that could be detected was a little fullness beneath the guttural pouch. The crico-thyroid ligament was then incised and the interior of the larynx examined with the finger. Everything appeared normal. A catheter was then passed through the crico-thyroid wound and readily entered the mouth and the nostrils. The nasal chamber was then trephined and an inspection made ; this revealed nothing abnormal.

A few days later, as the symptoms still appeared on the slightest exertion, an examination of the fauces was made under chloroform, but with no satisfactory result. The wounds in the larynx and face were allowed to close. The tracheotomy tube had still to be worn, as the animal roared at a slow walk. Four weeks later, as the symptoms of dyspnœa continued unabated, the animal was again placed under chloroform and the soft palate incised in the central line to an extent sufficient to admit three fingers ; in this way the whole of the pharynx was thoroughly examined. No growth could be felt, though the existence of one was suspected.

Splitting the soft palate is, so far as I know, a new operation, and an account of it may be desirable. I was familiar with the procedure, as I had endeavoured unsuccessfully to stop wind-sucking by completely dividing this structure. The palate is first punctured about its centre. I employed the old-fashioned phlebotomy instrument as being well guarded, and when it has pushed and scraped a way through the thickness of the membrane a finger is introduced, and between finger and thumb the part is rent in the direction of its length. It tears with moderate ease, and there is practically no hemorrhage. A good mouth gag which bears on the incisor teeth is indispensable. In the case of the horse under record it was not considered necessary to do more than make an opening sufficiently large to admit two fingers to thoroughly sweep around the pharynx. Subsequent events showed that it would have been better had the entire length of the structure been divided and the whole hand introduced. When there is a tube in the trachea a deliberate examination can be made. The result in this case was negative ; the fact is that the examination was imperfect, and that had the entire palate been divided I would have found the cause of the obstruction, as will be seen when the post-mortem appearance is described.

Before the last operation I removed the tube from the trachea and inserted one in the crico-thyroid space. The reason for this was that I dislike a tube in the trachea, as in consequence of irritation and cicatrical contraction malformation of the organ results, which renders the horse a permanent roarer or even unfit for light work. It was thought that no contraction could occur in the crico-thyroid space, and a special tube was fitted and attached to the head collar, as it had a tendency when tied round the neck to fall foward and come out. The laryngotomy tube was worn for ten days before death occurred ; one night it came out and the animal was found dead in the morning.

On post-mortem examination a suppurating lymphatic gland, the size of a large egg, was found between the base of the left guttural pouch and the roof of the pharynx. The swelling resulting from this enlarged gland was drawn into the glottis at each inspiration. The guttural pouch was thickened. There was evidence that the pus in the gland was working upwards to be discharged into the pouch. This swelling would have been discovered during life had I given myself more room to work by completely dividing the soft palate.

The result of the laryngotomy was most unsatisfactory. There was submucous œdema of the larynx, the membrane being roughened by the irritation of the tube. The thyroid cartilage was very rigid from inflammatory changes, the cricoid congested, the crico-thyroid ligament cartilagenous, and the arytenoids so stiff that they could only be made to slightly move by forcibly pulling them apart.

Remarks.—The suppurating lymphatic gland was doubtless the result of strangles infection.

There is no advantage in laryngotomy over tracheotomy ; both are serious operations in their after effects. A divided trachea contracts, the rings overlapping ; at times they unite by ossification, at others they are drawn inwards and curled by cicatrical contraction ; in consequence the lumen of the tube is greatly reduced. I never undertook this simple operation without the feeling that, though I was about to give immediate relief to a most distressing condition, the after effects on the trachea would be a standing reproach. I have had a few exceptions. When matters are not extremely urgent I have exposed the trachea deliberately, cut the membrane between the rings transversely, and removed as little as possible from the upper and lower rings, just sufficient to admit a small-sized tube. As a rule the extreme urgency of these cases does not admit of deliberate measures, and we are glad to get the knife into the lumen of the trachea and stop further suffocation.

It is obvious that the smaller the size of tube we employ the less the damage to the tracheal rings. I gradually reduced the diameter as experience dictated, but the disadvantage of a very small tube is that it so readily becomes clogged with discharge, the serum coating it with the firmness of glue, necessitating considerable attention if it is to function properly. In recommending a tracheotomy tube of small diameter I am referring solely to a temporary operation, and not to the permanent one employed in the relief of roaring. No horse can work with a small tube. As a profession we have had enormous experience during the last thirty years in tracheotomy. My experience points to a contraction of the trachea at the seat of operation, and if anyone can prevent this either by a modification in operation, or in the shape of the tube, he will be a public benefactor.

It will be observed that the short period of ten days was sufficient for laryngotomy to convert the larynx of the case above recorded into a hopeless condition, though the tube employed was small and did not appear to produce irritation. Personally I should not entirely despair of laryngotomy as a substitute for tracheotomy until I had tried a tube in the crico-tracheal space, though against this we have learned in numerous operations how readily the cartilages of the larynx become inflamed as the result of irritation in their vicinity, and the disastrous results which invariably follow. A rigid cricoid, however, is far less serious than a rigid thyroid.

Case 2.—In September, 1891, a horse was suddenly seized with intense dyspnœa and its life saved by inserting a tube in the larynx. This remained in only for a few hours, as all symptoms of suffocation passed away and could not be reproduced by closing the tube. Under chloroform the fauces were examined through an incision in the palate and a slight thickening above the pharynx was discovered, but nothing definite. The animal was given a long rest of six weeks and the "wind" then tested, when the patient was found to "roar" badly. A second examination of the pharynx revealed nothing. In consequence of his contracting mange a further long rest resulted, but in the following January, while at walking exercise, the patient was seized with acute dyspnœa, and a tube had to be inserted in the trachea; this was removed in a few days as it was no longer required. A fortnight later, while quietly standing in the stable, the animal suddenly suffocated.

Post-mortem examination revealed a few enlarged lymphatic glands between the guttural pouch and pharynx, but they were so small that they could not have been drawn into the glottis, as in Case 1. The whole length of the head and the larynx were carefully examined, but nothing abnormal was revealed. The heart was enlarged, the mitral and aortic valves were thickened and possessed vegetations; the aortic valves were very large and rigid, and the aorta dilated.

Remarks.—This was a very unsatisfactory case. That the suffocation was produced in the larynx, or anterior to it, is certain from the relief afforded by laryngotomy and later by tracheotomy. That the dyspnœa was sudden, temporary and recurrent is clear from the history of the case, but its precise nature is a hopeless mystery. Was it spasm of the glottis? I have seen many cases of laryngeal spasm from poisoning by the Indian pea *lathyrus satious*, but in all these cases the animals had to be walked before any dyspnœa occurred. The case under record suffocated while standing quietly in the stable. I fail to connect the heart lesions with the symptoms of asphyxia. Fibrillation of the auricles in the horse produces extreme distress and dyspnœa but not roaring. That death was due to suffocation, and not to the condition of heart, was proved by the presence of well-marked post-mortem appearances of asphyxia.

SOME NOTES ON INTERNAL PARASITISM IN HORSES.

By D. MARSHALL, M.R.C.V.S.,
Balclutha, Otago, New Zealand.

THE following notes were put together after perusal of the interesting case of "red worms" described by Mr. R. Beattie in THE VETERINARY JOURNAL for May. The cases indicate that in this Province, Otago, N.Z., nematode worms in horses are responsible for much loss. They may directly or indirectly cause the death of the host, or produce such loss of condition that it is unfit for work. It is probable that with a thorough post-mortem examination many cases of volvulus of large or small intestine might be traced to parasitic lesions in the blood-vessels even if parasites were not at the time present in the lumen of the bowel.

These parasites would seem to behave occasionally like some of the micro-organisms present normally in the respiratory and alimentary tract, in that a sudden lowering of vitality may render them pathogenic. In two of the cases described the animals were in good condition. A day's unusually hard work produced signs of illness, and then only was the presence observed of large numbers of parasites.

Maurice Hall, in the valuable articles reprinted in THE VETERINARY JOURNAL, August, 1919, from the *Journal of the American Veterinary Medical Association*, December, 1919, etc., after giving the results of various experiments to test different anthelmentics, concludes that carbon bisulphide is 100 per cent. effective against bots and ascarids, and that oil of chenopodium plus a purgative after a fast of twenty-four hours gives reliable results against strongyli, turpentine and linseed oil being the next best. As oil of chenopodium is not obtainable here, the treatment has consisted of a course of eight to twelve daily doses of cupri. sulph., ferri. sulph. and arsenic, followed by one and a half to two ounces turpentine in 1½ pints raw linseed oil, after fasting eighteen to twenty-four hours. The results have been satisfactory in many cases.

Case 1.—Five-year-old draft gelding, in fair condition, showing symptoms of impaction of colon, dull, mild pains, loss of appetite, impacted bowel palpable per rectum, pulse *weak*. Treatment by 2-drachm doses each amm. carb. and nux vomica three times a day. At the end of four days the impaction was apparently relieved, animal was feeding, pulse still very weak, and gait staggering. Fæces were soft, and contained large number of cylicostomes. Gradual recovery under tonics.

Case 2.—Eighteen months old Clydesdale filly, in fair condition. Dull, refusing feed, up and down, and inclined to sit on haunches; no evidence of acute pain, temperature 102, *pulse* 110, respirations normal, rectal examination negative.

Diagnosis.—None made. At first suspected some obstruction in small intestine, but mild nature of pain negatived this. Could not account for fast pulse.

Gave amm. carb. 1 drachm, ol. tereb. and æther sulph. *aa.* ½ oz., in repeated doses.

Following day: Little change, peritalsis slightly increased, pulse 100. When let out moved very stiffly, but started to feed. Continued stimulants.

On fourth day filly was very uneasy, turning round and round in a small circle, respirations accelerated and grunting, pulse 110, temperature 103. As filly was suffering much pain and getting worse in spite of treatment, though diagnosis was still obscure, destruction was advised, and immediately carried out.

Post-mortem.—Showed considerable reddish fluid in peritoneal cavity, gastric omentum thickened and adherent to large colon, peritonitis over serous covering of large colon, accounting for stiff gait and fast pulse, mucous membrane of large colon much infiltrated, and showing numerous whitish patches 1 to 2 inches across, and small areas of ulceration and necrosis. Large numbers of a reddish nematode, about 2 inches long. Strongylus equinus (?) adherent to mucous membrane. Mesenteric arteries at origin showed verminous endarteritis ulceration, thrombi of varying ages, and numerous nematodes, not identified.

Case 3.—Really a series of cases on the same farm, low ridges, boggy creeks in the gullies, opening into sandy river flat.

(*a*) Six-year-old draft gelding, ailing some time, very thin, conjunctiva and buccal mucous membrane very pale, eye sunken, pulse weak, gait staggering.

In fæces numerous young strongylus of cyliostome group.

Following powders were given daily for twelve days:—

Arsenic, grs. v.
Pulv. nux vom., 1 drachm.
Antim. pot. tart., 2 drachms.
Ferri sulph. ex., 1 drachm.

followed by ol. tereb. 1½ ozs., in ol. lini. 1 pint, given after 18-hour fast.

Contrary to expectation, this colt made a rapid recovery, and when next seen two months later was not recognisable, and "full of beans."

(*b*) Six-year-old draft mare, very dull for some days, and off feed. Temperature 100, pulse 45, steady; loud borborygmi; scouring, and tail covered by excreta, amongst which were many red worms of cyliostome group. Other symptoms were repeated yawning and sour breath.

A diagnosis of parasitic muco-enteritis was made.

A full dose of spirits ether nit., the only available stimulant, was given, cinchona and ferri. sulph. *aa.* 1 drachm, amm. carb. 1½ ozs., twice a day for six days, followed by ol. tereb. 1½ ozs., ol. lini. 1 pint, after 18 hours' fast. This mare made a good recovery.

Several of the other horses on this farm had shown somewhat similar symptoms. A period of dulness, partial loss of appetite, and repeated yawning, no diarrhœa.

Case 4.—Aged draft mare, ridge country, suffering from chronic tympany, food improperly digested, fæces evil smelling, temperature 101, pulse normal, condition poor, rectal examination negative. Examination of fæces for parasites or eggs was negative.

Diagnosis.—None made. Probability of some result of parasitism. Alteration in the colic mucous membrane or embolism of mesenteric vessel was suspected.

Treatment.—Arsenic grs. v., ferri sulph. *ex.sic.* 1 drachm, cinchona 1 drachm, in feed daily for twelve days.

This mare improved gradually.

Four months later was called again to this mare. Now in good condition. Dull and showing abdominal pain, never acute, eye sunken, pulse accelerated and weak, temperature 102. Mare staggered once or twice as if giddy, while being moved. Scouring, fæces thin, watery, blood tinged, contained scraps of coagulated fibrin. Where the liquid collected in a pool on the ground the surface was agitated by wriggling cylicostomes, present in great numbers. Even the thermometer, when withdrawn from the anus, had on it six or eight squirming young forms.

Gave ether nit. 2 ozs., camphor 1 drachm, tr. capsici 1 drachm, ol. tereb. 4 drachms, and followed twice a day with ether sulph. 2 ozs., ol. tereb. 1½ ozs., for three doses. The mare bucked up wonderfully.

Case 5.—Clydesdale mare, working hard, one morning refused food at noon, and for 48 hours after up till time I saw her, when she was dull, very slight evidence of pain, peristalsis audible, pulse 50-55 and good, temperature normal (per rectum). Rectum contained soft fæces in which were numerous cylicostomes ; small colon empty, pelvic flexure normal, right lower part of colon impacted.

Diagnosis.—Impaction of colon, induced by parasitic invasion.

Treatment.—Amm. carb. and nux vomica, each 2 drachms, three times a day.

Two days later animal still dull and appetite poor, fæces thin, contained numerous cylicostomes, pulse weak. Treatment changed to ether sulph. 1 oz. once a day ; not enough, in the circumstances, and later gentian, iron and arsenic. The mare was pretty weak for some days, but gradually improved.

Case 6.—Four-year-old draft colt on same farm as No. 5. Somewhat similar symptoms after stiff spell of work, *i.e.* dulness, depression, loss of appetite, weak pulse, diarrhœa. This animal was prescribed for by post, and, owing to this delay, was not treated for two days. In the meantime it developed symptoms of acute pneumonia, and died after 3½ days' observed illness.

Post-mortem.—Slight excess of fluid in peritoneal and pericardial cavities ; mucous membrane in large colon and cæcum inflamed, thickened, covered with nodules, small ulcers, and dirty grey patches of necrosis, particularly towards point of cæcum. Large numbers of cyliostomes present. Pleurisy of left side of chest, with some exudate, left lung consolidated. In trachea numerous egg-bearing female nematodes, *Dictyocaulus Arnfieldi* (?). This farm was fairly high land, running down to the sea.

Case 7.—Death from ascariasis. Clydesdale gelding in fair condition ; died after about an hour's observed illness with acute pain.

Post-mortem.—Ingesta present in peritoneal cavity when opened. Ante-mortem rent in wall of pyloric part of stomach, with several small ulcers or tears in mucous membrane surrounding it. Large numbers of bot. larvæ, with heads embedded in mucous membrane of œsophageal part. Slight excess of pericardial fluid. Duodenum felt firm to touch, and was packed with ascaris megalocephali. On an estimate over 750 present. The lumen of bowel was completely obstructed. The owners were rather inexperienced, otherwise it is probable that some earlier symptoms would have been noticed.

PARTIAL PARALYSIS OF THE SINGLE COLON.

By W. T. HEWETSON, M.R.C.V.S.,
Brampton, Cumberland.

In November, 1919, I wrote an article to The Veterinary Journal on a disease that I called "partial paralysis of the single colon." Up to that time I had failed to cure a single case, though many drugs were tried, and I had taken the opinion of three of my professional brethren, and searched the veterinary literature at my disposal for information. Since then I have had five more cases, and four of these died. I am pleased to say that the last case that came under my care recovered. The cure was effected very simply. As some of my readers may be unfamiliar with the complaint alluded to, I will again record the symptoms of the malady. The disease appeared in the months of July and August in mares and geldings, their age being from 3½ to 5½ years. The animals became affected when running out on grass. The symptoms manifest were present in each case, viz., the flanks are tucked up, giving the animal the appearance in this respect of a greyhound. The horse has lost condition, and the muscles feel hard, particularly in the region of the neck, which is usually depressed, like that of a sheep or camel. The horse looks dull, and the eyelids are sometimes kept half-closed. On lifting the tail the anus, and, if a mare, the vulva and skin adjoining are found to be bathed with perspiration. Tremors are seen on the muscles of the shoulder and hip. The respirations are normal, with the exception that a muffled sound can be heard, as if there was an obstruction caused by mucus in both nostrils. The pulse is weaker and quicker than normal, viz., 60 or 70 beats per minute. The temperature may be normal, or it may be as high as 105. The appetite is impaired, though not entirely lost. The bowels are constipated, the fæces being passed in small quantities and coated with mucus. The horse exhibits a difficulty in swallowing, and medicine, either in ball or liquid, is difficult to administer on this account. When liquids are administered there is a danger of choking.

Post-mortem.—I made a post-mortem on all the animals that died, with one exception. The post-mortem lesions were the same in every case. All the intestinal organs appeared to the naked eye to be normal, except the single colon. On examination this bowel was found to contain here and there hard, dry fæces covered with mucus, and when removed they left a raw or congested surface beneath. Evidently the fæces had been retained and become coated with mucus due to the torpidity of the bowel. Congestion more or less of the inner surface of the single colon was found in all the cases.

Cause.—It might be attributed to the condition and ripened state of the grasses at this time of the year. Personally, I am inclined to think the cause is more likely to be due to cold nights following warm days, and this acting more readily upon horses that are teething. The cold has a paralysing effect upon the bowel; the injecta is retained longer than it ought to be, undergoes decomposition, a poison is generated and absorbed, causing loss of appetite, loss of flesh, and giving rise to the tremors seen on the muscles and the increase in the temperature and pulse.

Treatment.—In the early cases the treatment adopted was as follows: A moderate dose of opening medicine was given, *i.e.* aloes, followed by nerve stimulants—pulv. nux vom. and ammon. carb. in form of ball. After the medicine had acted the horse appeared much improved. He moved about more, and was more anxious for food. He did not care for soft or semi-liquid food, but would take green food, such as newly-mown grass or a little crushed oats. At the commencement of the treatment there was not any anticipation that the horse would die. After the patient had eaten fairly freely of this green food for two or three days he became duller, and the symptoms that had become less pronounced reappeared. The fæces again became dry and covered with mucus. The dose of laxative medicine again had to be given. Some of the animals at this stage would lie and exhibit signs of dull pain, looking occasionally back at the flank. They continued to do this more or less until the bowels were relieved by opening medicine and enemata.

In the early cases many and varied were the medicines given to combat the different symptoms that arose during the course of the disease. The patient being again and again better and worse. This continued for about a month, when the animal was found unable to rise, and when lifted would lie in the slings, and made no attempt whatever to gain his feet if left lying on the ground. It died in 24 to 48 hours. The cases were most unsatisfactory and disappointing.

When my last case arrived I resolved to adopt a totally different line of treatment. Instead of feeding the horse on grass and semi-solid food, as I had previously done after the bowels were moved by medicine, I determined he should receive only liquid or semi-liquid diet, though he preferred grass and dry food. I made up my mind that he must be made to take liquids or semi-liquids, or die. He refused for four days after the bowels were moved by medicine to take any of this, but on that day he took a bucketful. He was fed on semi-liquid diet for one month. To make sure that no solid or dry food was taken the box was bedded with sawdust. The food given consisted of boiled turnips, boiled barley, linseed, and bran, with a liberal supply of salt in each feed. Milk on the farm was not plentiful, but he did not care for milk. Otherwise it might have been good for him The only medicine given was a laxative ball, followed by an occasional ball composed of ammon. carb., nux vom. and gentian. When the latter was not given he received a drachm of nux vom. pulv. in his food daily.

In about a fortnight the horse showed marked signs of improvement. The noise heard from the nostrils ceased. The tremors of the muscles had disappeared. Up to this time his rug was seen to be covered on its upper surface with moisture, as if a dew had fallen upon it. This became dry. The perspiration under the tail ceased, and the horse was brighter and more active. He moved more freely around the box, and the eyelids did not droop; the pulse being now normal, also the temperature.

The patient was kept on soft diet for a fortnight longer (though this may not always be necessary). During this time the bowels were kept regular by diet only. He did not require any opening medicine or injections of soap and water per rectum to keep them open. Under this simple treatment the horse made a good recovery, and this was brought about with much less anxiety and only half the trouble and expense entailed in the cases that died. The horse is still low in condition, but in this he will improve, as he eats anything and everything that is given to him.

TOTAL OBSTRUCTION OF SMALL BOWEL BY AN INGESTED STONE.

BY HUGH BEGG, F.R.C.V.S.,
Veterinary Inspector for the County of Lanarkshire.

THREE years ago, when passing the premises of the Hamilton Co-operative Society, I met Mr. James Pollock, Veterinary Surgeon, who told me he had been attending a very interesting case that had been troubling him for fully three weeks.

The animal, a six-year-old Clydesdale gelding, had been the subject of periodic abdominal pain during that time, and when I met Mr. Pollock he was beginning to consider the case hopeless.

The first attack of pain had been prolonged, and the symptoms were rather ominous, but after three days there had been a gradual recovery, though the horse was much worn with exhaustion. He was offered nothing but bran mashes and other soft food, which he took freely when rid of pain.

When Mr. Pollock told me of the case the horse had suffered five or six bad turns, and he thought there was some obstruction that was not removable. When I saw the horse that day the signs of abdominal pain were well-marked and characteristic, but the animal was not violent. At times he would stand for fifteen minutes on his hind feet while resting on his knees in front, and this position seemed to afford greater relief than any other, and indicated the tilting forward of the obstruction Mr. Pollock feared. On one or two occasions when the pain returned the patient sweated profusely from the very start. On the day I saw him his skin was steaming, the pulse was rather worn, and the temperature 103° F. He strained when examined per rectum, and nothing abnormal could be felt within reach, so that suspicion attached to the small bowel. An unfavourable prognosis was given to the owners.

From this time, until his death seven days later, the horse was more or less in constant pain. During the first three weeks recovery seemed so nearly complete that he was on the eve of going on duty on two occasions, when pain again returned.

Mr. Pollock made a post-mortem examination, and advised me that he had at his place a portion of the small bowel from which he had removed the composite stone which I have sent to you. The stone was more or less covered by inflammatory exudate of the area of enteritis set up by its presence.

The stone* was evidently a piece of the kiln-dried ornamental facing of the stable wall, and but for its very rough borders might have occasioned very little trouble. I have, however, never known a horse to swallow an unchewable hard body so large as this ; indeed, it has been my experience that all coins, stones, nails, and other metallic substances that found their way into the chop bin were eventually recovered in the horses feeding trough.

INTERESTING CASE IN A MARE.

By H. G. HEWETSON, M.R.C.V.S.,
Southport.

THESE notes are of an interesting case which I had under my care for nearly three months, and which ultimately had to be destroyed owing to the subject proving incurable. The history of the case is as follows :—The mare in question was a four-year-old vanner, bred by the owner, brought up on the farm, and never had a day's sickness in her life until attacked by this illness which proved fatal.

The first time the owner noticed that there was anything wrong with the mare was on or about July 16, 1920, and the four subsequent days, when he observed that the mare was isolating herself from the other horses at pasture in the same field, was not feeding, and would remain standing in one position for some time, but if approached by anyone she would move away and commence to pasture. The other animals, two young colts, remained healthy. The owner thought very little of this for three days, but on the fourth day he decided to have the mare caught and brought up into the farmyard to be examined. He kept her up, and on July 24 he called me in to attend to her, and I was in regular attendance on her until October 14 last, when the animal got down in the box, and being unable to rise, owing to weakness, she was destroyed.

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* The portion of stoneware sent by Mr. Begg measured $2\frac{1}{2} \times 2 \times \frac{3}{4}$ inches, a most unusually large foreign body for a horse to swallow.—(Editor VETERINARY JOURNAL.)

Symptoms.—On the first day I saw the animal I decided, after a careful examination of the patient, that I had a very uncommon and serious case to deal with, and I could not recall ever having seen a similar case before. On looking over the mare I found her general bodily condition to be good, visible mucous membranes of ordinary appearance, breathing, pulse and temperature practically normal, but she was showing a peculiar eruption and exudation from the skin round all four coronets, the site of the chestnuts on the hind limbs, and the mammary glands, which were atrophied. From the top of all four hoofs, for a distance of about 2 inches, the hair had been cast off and the skin was exuding an amber-coloured discharge, the odour of which resembled that from a greasy-legged animal. The hind chestnuts had dropped off, and the discharge from their sites and the skin of the mammary gland was similar to that from the coronets. Another important symptom was a relaxed condition of the bowels, which, during the period of illness, gradually developed into diarrhœa, in spite of all treatment. After the case had been under treatment for about a month more eruptions with exudations took place on the legs and head. The front chestnuts dropped off and became similar to the hind ones, and eruptions appeared around the eyelids, nostrils and lips, and I might state here that throughout the whole course of the illness none of these surfaces showed the slightest tendency to heal. Emaciation commenced, and gradually became worse, and on the day of her death she was a mere frame.

Treatment.—I think it must be admitted, after reading the history and symptoms in this case, it was a difficult matter to diagnose correctly the exact nature of the disease the mare was suffering from. However, I came to the conclusion that all these external symptoms were secondary affections due to an internal cause of some kind, probably affecting the alimentary tract, and that nature was doing her best, through the bowels and the skin, to throw out the poisons which were causing trouble. The treatment received during the course of the illness was—first of all she was placed in a large loose box, which was kept as clean and sanitary as possible, and given an aperient of linseed oil and turpentine, and this was followed up internally by good food, tonics, astringents and antiseptics, and externally by the application of liquid and dry antiseptic dressings. During the illness several veterinary colleagues saw the mare, and about fourteen days prior to death Mr. Hy. Sumner was called in consultation. He agreed that the cutaneous lesions were the result of some absorption of deleterious material, which most probably had its origin in the double colon and cæcum. Parasites were sought but not found. As a precaution (uræmic poisoning) the urine was drawn and examined. This was normal in colour and quantity, and on sample examination did not react to the test for albumen or sugar.

Post-mortem.—October 15, 1920, when the carcase was opened, the first thing one noticed was the pale appearance of the bowels, with a very marked leopardised pigmentation all over them, especially the small bowels. The whole of the abdominal lymphatic glands were enlarged, especially those of the double colon and cæcum ; those of the latter were mottled with small opaque grey centres, suggestive of miliary tuberculosis. A section was made into tip of cæcum in further search for parasites, which were not present. The mucous membrane showed several widely scattered superficial ulcers the size of a thumb nail. In completing the section of the organ there was exposed a greatly enlarged ileo-cæcal valve, with considerable thickening of the surrounding mucous membrane and submucosa. In several places the membrane was eroded, presumably the result of local superficial necrosis, and the growth extended into the membrane of the forth portion of the double colon. The condition of the ileum was interesting. It showed several concentric bands, about 4 to 8 inches apart, for about 2 ft. before entering the valve, evidently indicating some continued extra effort to pass the ingesta through the ileo-cæcal valve. The lungs, heart, liver, spleen, and kidneys were normal in structure, but some parts showed signs of catarrhal affection, and the ovaries were cystic.

Mr. Hy. Sumner was present at the post-mortem, and he has revised these notes. Portions of the growth were sent to Professor Glynn, Liverpool University, and the result of his examination is that it is a lympho sarcoma.

SOME CANINE CLINICAL NOTES.

By JAS J. O'CONNOR, M.R.C.V.S.,

Professor of Surgery, Royal Veterinary College of Ireland.

1.—FOREIGN BODY IN THE ŒSOPHAGUS.

Subject.—Field spaniel.

History.—The dog had been ill during about six weeks, vomiting, or attempting to vomit, repeatedly, but was able to take sloppy diet. During this time he was under veterinary treatment for gastritis, and, no improvement occurring, further advice was sought, when obstruction of the œsophagus at the entrance to the chest was diagnosed and confirmed by me.

Symptoms.—Those of dysphagia and a swelling at the level of the œsophagus in the prepectoral region. The œsophageal sound was arrested at this point.

Treatment.—Performed œsophagotomy under $Ch.Cl._3$ at the level of the obstruction, and discovered a large irregular piece of cartilage emitting a stinking odour lodged in the gullet, which was necrosed and perforated in the region pressed upon; removed the foreign body, washed the wound with a solution of pot. permang. and left it open throughout.

The dog was fed on milk diet for a few days, and afterwards on mixed diet. The œsophageal fistula gradually closed, and was completely healed in the course of three or four weeks.

One year afterwards the dog was reported as doing well on a shooting expedition with his owner in Scotland.

It was surprising that the animal was able to swallow at all, and that he remained in good condition with so large and apparently complete an obstruction. Moreover, the œsophagus was so much damaged one would have expected stenosis to supervene within twelve months afterwards.

2.—

Subject.—Scottish deerhound.

History.—After partaking of chicken bones the dog showed symptoms of choking.

Symptoms.—On examination of the cervical portion of the œsophagus a slight swelling was detected at the level of the larynx, but nothing definitely could be felt. The animal evinced pain on manipulation of the part. It was concluded that this was the seat of obstruction.

Treatment.—Injected a solution of cocaine hypodermically in the place mentioned and performed œsophagotomy there. On passing a forceps into the œsophagus it grated against a piece of bone, fixed transversely in the tube; removed it and found that it was a splinter of chicken bone about 1½ inches long, and sharp at both ends. Completely sutured the œsophageal wound, and partly sutured that in the skin. Sent the dog home at once. Recovery was uninterrupted.

3.—Foreign Body in the Larynx.

Subject.—Pekingese dog.

History.—Twenty-four hours previously the dog had been very frisky, playing about, when it suddenly stopped, and showed great distress, panting rapidly. The owner believed that it picked up something during play.

Symptoms.—The animal was suffering from severe dyspnœa. The mouth and throat were examined, and nothing could be seen. A little water was then given to see if it could swallow freely, and made the animal cough. Re-examination of the pharynx and larynx revealed something abnormal in the lumen of the latter. On removing it with a forceps it was found to be a piece of a skin of a boiled potato. After its extraction the animal became quite normal.

A little water evidently entered the larynx and caused the foreign body to be coughed into view.

4.—TUMOUR OF THE TESTICLE.

Subject.—Clumber spaniel, a very good shooting dog.

History.—The tumour had been noticed for some few weeks, gradually increasing in size, and latterly becoming very painful, causing the animal to lie down repeatedly after going a short distance.

Symptoms.—A nodular, hard, irregular tumour, about the size of a man's fist, involving the right testicle. It was not ulcerated.

Operation.—Having administered chloroform, an incision was made encircling the tumour near its neck, exposing the spermatic cord, which was considerably thickened.

The latter was severed as high as possible with the emasculator which, however, did not prevent hæmorrhage, and a ligature was consequently applied on the bleeding stump.

When the patient recovered from the chloroform he evinced signs of severe pain. Two grains of morphia were then given, but proved insufficient. Another grain was consequently injected and had the desired effect, causing the animal to go into a dead sleep for twenty-four hours.

From naked eye appearance, and by analogy from previous cases, I thought the tumour was sarcoma, and that it would recur. The wound, however, healed well, and six months afterwards the dog was in perfect form. The tumour was accidentally thrown away preventing microscopic examination thereof.

Since writing the above I have learned that the dog commenced to evince pain again about 7 months after the operation, and the owner then destroyed the animal; presumably the tumour was recurring.

5.—PUPPY DEVOID OF EYES.

Subject.—King Charles spaniel, said by owner, a fancier of this breed, to be an ideal specimen in every way except for the absence of eyes.

The eye lids were perfectly formed over orbits filled with fibrous tissue. The puppy was destroyed, and post-mortem examination revealed no trace of eye-balls.

6.—VENTRO-FIXATION FOR PROLAPSE OF THE BOWEL WITH INVAGINATION.

Subject.—A valuable pointer dog, about six months old.

History.—The dog, which was in fair condition, and apparently in the best of general health, had been under veterinary treatment for about two months on and off for prolapse of the bowel with invagination. The longest time the affected portion of bowel remained in the abdomen after being returned and the anal suture removed was ten days. As a rule the prolapse recurred a few hours after removal of the suture in the anus.

Symptoms.—The prolapsed mass extruded for about 10 inches behind the anus. The posterior part of the rectum was evidently not involved in the condition, as there was a deep space all round between the prolapse and the rectal wall inside the pelvis. It was a case of intussusception of the bowel appearing behind the anus.

Treatment.—The prolapsed mass was pushed back into the abdomen without much difficulty, and prevented returning by a purse-string suture in the anus. A worm draft was given the dog on the assumption that the source of irritation and straining might be intestinal worms. After three days the suture was removed from the anus, and the dog appeared to be going on all right for a fortnight afterwards, when it was decided to send him home as cured, but before one had time to do so the prolapse recurred to its full extent; in fact, seemed more formidable, as the original invagination was invaginated on itself in the form of a ruff behind the anus.

Reduction was again effected, but on palpation afterwards through the abdominal wall it was ascertained that the invagination was not completely undone, as it could be felt as a large cylindrical mass in the middle of the abdomen. It was decided to perform ventro-fixation of the affected part of the bowel. This was done the next day.

Operation.—Laparotomy was performed on the middle line behind the umbilicus, and the ileum was found invaginated for a distance of six inches. By careful manipulation the invagination was reduced. Where the invagination commenced the bowel was quite hard, almost brittle, so that when it was squeezed between the finger and thumb it cracked on its peritoneal surface on the convex side.

The right lip of the parietal wound was everted by means of a swabbing forceps (with wide hollow jaws), and the mesentery of the bowel immediately in front of the point where the invagination began was sutured to this part of the abdominal wall by two fine kangaroo tendon sutures, inserted by means of a fine curved needle.

The patient recovered completely from the operation, and three months have elapsed since it was performed without the condition recurring.

The anterior part of the invagination was evidently never reduced when the prolapse was returned, thus accounting for the condition persistently recurring. It is remarkable that the animal never seemed to suffer any inconvenience from the intussusception, and retained his appetite all the time.

7.—Cat. Prolapse of Bowel with Invagination in a Kitten.

Subject.—A thin black kitten, affected with diarrhœa.

History.—The bowel had been prolapsed for forty-eight hours.

Symptoms.—A dark red prolapsed mass of bowel, protruding about five inches behind the anus, with a space between it and the rectal wall inside the pelvis, showing that the pelvic portion of the rectum was not involved.

Treatment.—Anæsthetised the patient with A.C.E. mixture and returned the prolapsed mass into the abdomen, but failed after prolonged manipulation through the abdominal wall, and the injection of warm water, to reduce the invagination. Consequently decided to operate at once.

Operation.—Performed laparotomy between the umbilicus and the pelvis, and found the bowel just in front of the latter invaginated for a distance of about 4 inches; reduced the invagination, and sutured the mesentery to the abdominal wall with two fine kangaroo tendon sutures.

Result.—Although the diarrhœa persisted for several days after the operation the animal made a good recovery.

Remark.—Where the invagination commenced the bowel was hard and fibrous in consistency, as in the case of the dog (No. 6).

8.—Urethal Calculi in a Fox Terrier.

Subject.—A five year old wire-haired fox terrier in very obese condition.

History.—For some time the animal had shown difficulty in micturition, the urine coming away in drops.

Diagnosis.—Urethral calculus confirmed by passage of the catheter, which was arrested a short distance behind the os penis.

Operation.—Performed urethrotomy at the point where the catheter was arrested, and removed a calculus, but still the urine could not escape freely. Reintroduced the catheter and discovered another obstruction a couple of inches further back. Opened the urethra at the latter point and removed another calculus. The urethra was now clear throughout. Left the wounds completely open and ordered them to be dressed with a solution of soda bicarbonate and boric acid, an alkaline application to counteract acidity of the urine and thus diminish the risk of gangrene following infiltration of the tissues with urine.

Prognosis.—Guarded, fearing infiltration and gangrene owing to the obese condition of the patient.

Result.—The animal made an uninterrupted recovery, no complication supervening. One year and a-half afterwards the dog was in perfect health without any indication of stricture of the urethra.

THE RELATIVE PATHOGENICITY FOR CATTLE OF *TRYPANOSOMA CONGOLENSE* AND *T. VIVAX*.

By H. E. HORNBY, M.R.C.V.S.,
(*Northern Rhodesia*).

During 1920 I had the opportunity of studying a number of herds of native cattle on the Tanganyika Plateau which were affected with Trypanosomiasis. One large herd, in particular, under the supervision of Stock-Inspector J. Goddard, furnished me with much material for observation and experiment, and I am much indebted to this officer for his great assistance.

Examination of an affected herd would reveal animals ranging in condition from excellent fatness to emaciation. Interrogation would elicit the information that although many cattle had died, yet a number of those now in good condition had been sick and recovered. Many affected cows abort or throw weakly calves, but if such a beast is young, and grazing is good, she may pick up and rear her calf as well. A recovered animal may relapse and die.

We examined, microscopically, the blood and gland-juice of thirty cattle affected with, or said to have, recovered from the disease. In no instance did we find trypanosomes in a beast which showed no clinical symptoms of the disease, even though it were said to be a recovered animal.

Sixteen cows were found to harbour trypanosomes demonstrable by microscopical examination. Of these ten were infected by *T. congolense* and six by *T. vivax*.

Species of tryp.	Animals affected.	Gland only + ve.	Blood only + ve.	Blood and Glan + ve.
T. congolense	10	1	2	7
T. vivax ...	6	3	1	2

This tends to show that *T. vivax* infection may be overlooked if one resorts to blood examination only. The glands usually examined are the prescapular ones.

To determine from which infection spontaneous recovery under good conditions was likely to take place, we picked out four young cows affected with *T. congolense,* and four similarly harbouring *T. vivax.* They were left under the ordinary conditions of village management at a time of year when grazing was still plentiful.

Three months later all four *T. congolense* animals were dead. Of the *T. vivax* beasts one had died, one was very thin, but with blood and gland-juice active, and two appeared to have recovered.

To test the immunity of those two recovered animals, Mr. Goddard injected them subcutaneously with blood rich in *T. vivax.* Eight days later both were decidedly ill and their blood was heavily infected.

Previously I had picked out a heifer which was said to have been ill and aborted a year ago, although at the time of experiemnt she was fat and fit, and injected her with two strains of *T. congolense.* I do not know with what species of trypanosome she had been infected previously, but she rapidly succumbed now, dying a month after inoculation.

I conclude, then, that in some districts a number of native cattle recover spontaneously from *T. vivax* infection, but that no great immunity results therefrom.

Correspondence.

To the Editor of THE VETERINARY JOURNAL.

SIR,—The annual report of the Civil Veterinary Department, Behar and Orissa, for the year 1919–1920, is indeed a matter of congratulation, and does credit to the Superintendent, Mr. D. Quinlan, M.R.C.V.S., whose energetic administration of the Department under his control has won for him the thanks of the Lieut.-Governor in Council.

The reorganisation of the Department was sanctioned by the Secretary of State for India, and an additional Imperial Officer, Mr. P. B. Riley, M.R.C.V.S., has joined and is under special training. It is hoped that this official will soon take over the duties of the North Behar Circle, which will relieve the Superintendent of a portion of his administrative duties, as these have for some time been too much for a single officer.

This is undoubtedly a step in the right direction; but what seems most urgently required (now that the pay and prospects of the subordinate staff have been placed on a much better footing than ever before), is that the training at the Bengal Veterinary College should be improved by the appointment of additional European professors, to which successive Boards of Examiners have called attention; for no progress can be made unless a more adequate teaching staff is provided. Such a staff costs money and this would necessarily be a debit against the District Boards of the Province, which no doubt have already too great a call on their inelastic resources. The question then arises, where can the money be got? The answer is:—*By voluntary contributions.* Once the object is explained, believe me, the money would pour in. It would be privately collected by merchants and others, at a small sum of a few pies per maund of rice, etc., bagged; and this would cover the additional expenditure required for the extra European staff at the Bengal Veterinary College, which annually turns out so many graduates, to whose care are entrusted the sick cattle in the Province.

Cattle, as is well known, are by Hindus held in great and superstitious reverence. Few people travelling in India can fail to notice the part played, whether in the flesh or its representation, by the cow and the ox. Sacred cattle wander unmolested and unmolesting through the streets of the cities. Some *Naddis*, the bulls of *Siva*' keep guard before his temples, and round his tanks. They are carved on the walls of many a rock cavern, and the *Shastras* lay down most emphatically that cattle must be cared for by the people, and not be ill-treated; or, to use the words of the Hindu Sacred Book, "*Ahimsa Parmo Dharmaha.*"

The District Boards would thus be saved a deal of extra expenditure, which the Government Resolution under review anticipates will come with the development of self-government, and there would be no doubt that the money would be forthcoming, as it is not an unusual way in India of raking in charities.—Yours truly,

C. V. DALRYMPLE-HAY,
January 9, 1921. *Ag. Deputy Commissioner (Retired) Madras.*

A VETERINARY MASONIC LODGE.

To the Editor of THE VETERINARY JOURNAL.

DEAR SIR,—I ask you to find space in your next issue for this letter, asking for views and suggestions from those interested as to the advisability of starting a Masonic Lodge (Veterinary) in London. A very large number of our profession hold high positions in the Craft, and I have long felt that a lodge would supply a much-felt want for British Veterinary Freemasons. If it meets with approval, I would be happy to do my share in the matter and would like to hear from those who fall in with the suggestion, stating their lodge and rank in the Craft. Thanking you in anticipation. I am,

Yours very truly,
RICHARD SCOTT, *Capt., R.A.V.C. (temp.)*,
P.P.G.J.W., Cumb. and Westd.

Station Veterinary Hospital,
Bordon, Hants.
December 26, 1920.

Personal.

THE period during which M. le Vétérinaire-inspecteur Fray (who has recently been retired on account of age) held the position of Chief Veterinary Officer in the French Army will always be a notable one in the history of the progress of the profession. Special attention is drawn to this in an article by the Editor of the *Revue Générale de Med. Vétérinaire*, the principal improvements being:—(1) The attachment of a veterinary officer to General Headquarters; (2) the substitution of veterinary hospitals as separate units in contradistinction to the Depots de Chevaux Malades, which were formerly attached to, and under the control of the Remount Department; and (3) the establishment of a research laboratory for the study of animal diseases controlled by officers in the Veterinary Service. Undoubtedly these reforms, so long needed, were hastened forward by the late war, and the intimate contact and exchange of confidences which took place between the heads of the British and French Veterinary Services.

M. Victor Drouin, D.S.O., whose name will be remembered by many of his English colleagues during the time of the late war, when he held the rank of Major in the French Veterinary Service, and was attached to the Headquarters in Paris, has been appointed Inspector General of the Public Sanitary Service.

VETERINARY STUDENTS IN GERMANY AND AUSTRIA-HUNGARY.

It is stated in the *Revue Générale* that the number of veterinary students in Germany enrolled in the summer session of 1920 is 1,571, these being distributed as follows:—Hanover 515, Munich 343, Berlin 308, Dresden 203, and Giessen 202. In Austria-Hungary there were 561, of whom Vienna had 471 and Buda-Pesth 90.

A CORRECTION.

By a printer's error, the letter from Prof. Bradley, on Page 6 of the January issue, was addressed "*To the Editor of* THE VETERINARY JOURNAL." It should have been: "To the Editor of *The Medical Press and Circular*," and was abstracted in full as being likely to be of interest to our readers. It was a reply sent by Professor Bradley to a statement in the December 8 issue of that paper that the prospects of the veterinary profession were very gloomy at the present time.

NOTICES.

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THE
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Sub-Editor:
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MARCH, 1921.

Editorials.

THE NEW "DANGEROUS DRUGS ACT."

A CONSIDERABLE amount of alarm, judging from communications received, appears to exist in the minds of a large number of the profession, that the new "Dangerous Drugs Act" is likely to affect the liberty of a qualified veterinary surgeon in the matter of prescribing, or even using, cocaine, morphia, heroin, and certain other drugs which have figured so much lately in the public Press on account of the improper uses to which they have been put.

No alarm need, however, be entertained that the situation has been missed, as the Council and the Ministry of Agriculture have the matter well in hand, and the profession can rest assured that they will have the same treatment in regard to the use of these drugs as is accorded to the practitioner in human medicine.

Restriction upon these "dangerous drugs" was necessary, and it was high time that it should be made. The qualified practitioner, whether veterinary or medical, will have to obey certain regulations, but the drugs will be obtainable by him for any legitimate purpose.

To the quack the Act may prove a bugbear; for cocaine, unless he be specially licensed, will only be obtained in certain roundabout ways; and as (if he operates at all) he is legally bound (or supposed to be) by the Animals Anæsthetic Act, to use an anæsthetic for a certain scheduled list of operations, he will have to forswear that drug and learn the use and dosage of some of its various synthetic substances.

DISEASES COMMUNICABLE FROM ANIMALS TO MAN.

In this issue we publish a very interesting abstract from the *Journal of the Royal Army Medical Corps* on "Cats and Human Diphtheria," in which the author asserts that "the evidence brought forward from the association of human diphtheria cases with cases of illness amongst cats whose throats are said to show diphtheria bacilli must be regarded as valueless in almost every case." We also publish another abstract from *The Lancet*, in which it is stated that cats are carriers of virulent diphtheria bacilli, and are thus a danger to human beings. Thus do medical opinions differ. They are especially interesting just now in view of the fact that a combined and well-attended meeting of the Royal Institute of Medicine and the Central Veterinary Society was held recently in London, the subject of the lecture being "Observations on some Diseases Communicable from Animals to Man." A number of diseases were alluded to, but special emphasis was drawn to those which, if stamped out in animals, would not exist in man. Of particular importance in this category were glanders, anthrax, rabies, foot and mouth disease, and certain varieties of mange and ringworm. Their existence emphasises the importance of the medical and veterinary professions working together hand in hand, and shows, too, the value of the practice of scientific veterinary pathology as a bulwark to lessen the number of human diseases.

Taking glanders as an illustration. This disease always has its origin in an animal of equine or asinine origin, and once it is completely stamped out of the equine species its danger will be completely done away with as regards mankind. Its only origin then could be the pathological laboratory. Veterinary science can claim priority in the prophylaxis and diagnosis of this disease, for by the use of mallein as a diagnostic agent, and the application of common sense methods after its use, the number of cases of glanders has been reduced from 2,370 animals in 1901 to 31 in 1920, and this, too, after the sale of some 150,000 Army horses and mules which had been gathered together from various countries, and employed in the work of the greatest war the world has ever known.

There is every reason to hope that this year or the next will see glanders stamped out of Great Britain altogether. It would be good if anthrax could be placed in the same category, but here we have a more difficult problem, mainly on account of the importation trade in hides, hair, calves and other foodstuffs, and manure. Rabies and foot and mouth disease were once "cut out," and it is unfortunate that they have ever made their presence felt again. However, they are only here temporarily, as the vigilance of the Veterinary Department of the Ministry of Agriculture has effectually prevented the spread of either, and confined their respective ravages and inconvenience to local areas.

Mange and ringworm have each their own genera which affect mankind by transmission from other humans, but the mange and ringworm of all animals are transmissible to man, and once stamped out from the veterinary world will remove one more anxiety from the shoulders of the medical practitioner.

The fact that diseases exist capable of communicability from animals to man makes it more and more imperative that the medical and the veterinary worker shall go hand in hand, and not conduct their scientific researches in separate and watertight compartments.

THE CONQUEST OF RINDERPEST IN BELGIUM.

At last veterinary authorities in control of the Belgian Veterinary Sanitary Service are able to breathe more freely in the hope that they are once again free from rinderpest. Their successful efforts mean the salvage and economy of millions of francs, for had this dread disease spread unchecked, it would have spelled ruin to agriculture and been a terrible menace to the civilised continent of Europe. The congratulations of our profession are forwarded in all sincerity to our Belgian *confrères* on the success which has attended their efforts and their skill.

General Articles.

CATS AND HUMAN DIPHTHERIA.

Dr. W. G. Savage, C.M.O.H. for Somerset, has been at some pains to determine for himself whether there are any grounds for the "belief amongst medical men, particularly those who are medical officers of health, that cats may suffer from diphtheria, and convey it to human cases, and that they are a not uncommon source of infection." Dr. Savage presents an account of his investigations to the

Journal of Hygiene for February, 1920, pp. 448-462, and arranges his article as follows :—

(1) Account of available evidence upon which the association of cats with diphtheria has been built.

(2) Summary of his own investigations.

(3) Critical considerations of the whole of the data available.

The evidence reviewed in the first section is both experimental and epidemiological.

I. HISTORICAL EVIDENCE : (*A*) *Experimental.*—The work of Klein in 1888, 1889 and 1890 is chiefly discussed as being "the most considerable in volume and of most importance as regards its influence upon contemporary and later medical opinion."

As a result of inoculating cats and kittens subcutaneously and intravenously with pure cultures of diphtheria bacilli, death followed in the majority of cases, and the post-mortem changes were considered by Klein as "extremely characteristic of diphtheria disease in the cat." These changes were chiefly noticed in the kidneys, and were as follows :—

Enlargement of the whole organ ; almost entire cortex grey and in a condition of fatty degeneration ; medulla by contrast much congested ; swelling of uriniferous tubules ; extensive fatty degeneration of epithelium.

As regards feeding experiments, one kitten and two cats fed by Klein with agar cultures in milk remained well, but two other cats which were fed in the same way on three separate occasions became very thin, though showing no other symptoms, and were killed three or four weeks after the beginning of the experiment. Klein considered that these animals showed post-mortem changes similar to those that obtained in the case of the inoculated cats, and wrote : "From these experiments it is seen that by *repeated* feeding with cultures of diphtheria bacilli, distributed in milk, unquestionable diphtheria disease can be produced in the cat." But, as Dr. Savage remarks here, "not the slightest bacteriological proof is given or evidence supplied of the presence of any clinical or pathological features of diphtheria."

From post-mortem appearances, especially in the kidney, Klein also diagnosed cat diphtheria in animals, which he considered were accidentally infected from human cases.

Renshaw (1885), in 1874, administered diphtheria membrane from human cases to a number of cats, most of which became ill and died and were found with diphtheric membrane on the fauces, bronchial tubes, etc.

Welch and Abbott (1891) inoculated into the trachea of a half-grown kitten a platinum loopful of pure diphtheria culture. The animal died on the third day, and diphtheria bacilli were found in the membrane which had appeared in the trachea and larynx. No other remarkable lesion was found " unless it be a greater degree of fatty metamorphosis of the renal epithelium than is normal in kittens."

(*B*) *Epidemiological Evidence.*—The author gives particulars of a number of cases which may be condensed as follows :—

Turner (1886), apparently the first observer to report the association of illness amongst cats with cases of human diphtheria.

Evidence entirely circumstantial, consisting of the concurrent presence of human cases with cats ill with swelling of the neck, foul discharge from the nose, eye inflammation, etc.

Bruce Low (1888) reported similar relationship at Enfield.

Williams (1895). In a house harbouring a human diphtheria case, three cats taken ill with wasting, loss of appetite, inability to swallow. All died. In one, Klein reported extensive disease of the lung, not uncommon among cats.

Gwynn (1893) at Hampstead. Here the cat's throat symptoms were due to an unhealed abscess.

Dowson (1895) examined a cat from a house in which fourteen days previously a child had died of diphtheria. Cultures from lung yielded pure cultures of an organism morphologically resembling the diphtheria bacillus.

Symes (1896). Kitten in close contact with a fatal case of diphtheria was subsequently attacked with vomiting and diarrhœa, slight swelling of neck and with patches of yellow exudation on the fauces. These patches extended, and the cat finally died, but was buried without a post-mortem.

Barras (1905). Illness in cats attached to two houses in Govan, where diphtheria had occurred. Micro-organisms isolated from the throats of these cats were found to correspond in every respect to those of the human diphtheria bacillus. No details of symptoms, and no account of the bacteriological technique are given. A stray cat which had found a home with one of the affected families was found to be suffering from post-diphtheritic paralysis of hind legs.

Porter (1903) obtained organism from the fur of a cat living in a house where there were several cases of diphtheria, and these bacilli were identical in appearance (Methylene Blue and Neisser's) with the Klebs-Löffler bacillus.

Mapleton (1913). During an outbreak of diphtheria at the Cottage Home, Newton Abbott, three cats were bacteriologically examined and two were found infected. The bacilli were not isolated in pure culture, and no inoculations into animals were made. The cats were not ill.

Webb (1914) reported an outbreak of illness among cats at Leigh (Lancs.) which seemed associated with a case of diphtheria in a child. The cat belonging to the house which contained the human case of diphtheria had been ailing for over two weeks, had a peculiar cough, could not miaul properly, refused food, was very thin, and could hardly move. During the previous week two cats presenting similar symptoms had died in neighbouring houses. The throat of the first cat was in a dirty and sloughing condition and cultivations showed " a bacillus having the characteristics of the K.-L. bacillus." Organism not isolated in pure culture, and no cultural or inoculation tests.

Five other cats in same street were found to be ailing and were destroyed.

Priestly (1915) examined nine cats belonging to the Stockwell Orphanage at a time when diphtheria was prevalent in the institution. None of the cats were clinically ill, but four " carried the diphtheria bacillus." The bacilli were said to be morphologically and culturally undistinguishable from the true K.-L. bacillus, but no inoculation experiments were carried out, and apparently the bacilli were not isolated in pure culture.

II. THE AUTHOR'S INVESTIGATIONS : *(A) Bacteriological examination of the throat and nose of healthy cats not associated with any cases of human diphtheria.*—Eight cats and twelve kittens were the subjects of this inquiry. The method of examining consisted in taking one or more swabs in the ordinary way, and then charging at least three blood serum tubes and one agar tube in series without recharging. The usual order was one serum, one agar, one serum, one serum tube, the object being to obtain considerable dilution of bacteria in the last two tubes, so that discrete colonies could be obtained.

Result.—(1) All the twelve kittens failed to show any bacilli at all resembling diphtheria organisms. (2) Swabs from three of the cats showed no bacilli at all resembling the K.-L. bacillus.

From the remaining five cats (*i.e.*, in 66 per cent.) bacilli were isolated which to the author and the county pathologist presented no morphological differences from true diphtheria bacilli. "All of them, however (with possibly one exception), were definitely not true diphtheria bacilli."

The possible exception was a cat from a girls' school, which was twice examined, and in which on both occasions the bacillus isolated was " extremely like the true diphtheria bacillus both morphologically and culturally." The blood serum colonies, however, had a distinct yellow tinge, and the bacillus was non-pathogenic to guinea-pigs.

(*B*) *Examination of cats associated with human cases. The number of such cats examined was five.*

Result.—(1) A favourite cat, much in the room with a severe case of diphtheria, and with two children who had severe colds but were diphtheria negative.

The cat presented no symptoms. Primary films showed bacilli undistinguishable from K.-L. bacilli, but in pure culture these bacilli were far less like the true diphtheria bacillus.

(2) Cat living in close association with a woman suffering from diphtheria. Cat had no general symptoms ; throat swab showed a few bacteria suspiciously like diphtheria organisms.

(3) Cat associated with case of diphtheria. Animal remained quite well, and throat showed no bacilli like the K.-L. bacillus.

(4) Boy of eight developed diphtheria on November 22, 1916. The cat, which was continually fondled and nursed by the boy, had been " off its food " for a week previous to the boy's illness, and then showed difficulty in swallowing.

Cat swabbed December 6 : " Bacilli impossible to exclude as not K.-L. bacilli." They were only present in small numbers and on a second swabbing later no such bacilli were found.

Cat killed, and post-mortem showed no changes even in the kidneys. Swabs from throat and trachea negative.

(5) For three to four weeks previous to the removal to hospital of a bacteriological case of human diphtheria, the house cat was ill, refusing to eat, and being the subject of a discharge from nostrils and mouth. The cat had quite recovered by the time the case was sent to hospital, and six days after this event she was swabbed and then killed. There were no macroscopical changes seen at the post-mortem.

Films made from blood serum cultures showed bacilli which morphologically and culturally were K.-L. bacilli, but they were innocuous to guinea-pigs. The author thinks that in the case this bacillus " may possibly have been a non-pathogenic Klebs-Löffler bacillus."

(*C*) *Experimental Investigations with Kittens.*—Arguing that " if cats suffering from diphtheria act as carriers of the diphtheria bacillus it should be possible to infect them artificially and set up either condition," the author experiments with several kittens in which previous throat swabs had in every case proved negative.

Results.—(1) It was found impossible to infect them by throat swabbing, even with massive doses of various strains of bacilli recently isolated from acute human cases.

(2) Mixed cultures direct from human throats were innocuous even when an artificial nidus for local growth was provided by chemical or mechanical means (iodine and scarification.)

(3) Implantation of vast numbers of bacilli in nasal cavities equally ineffective.

(4) Feeding experiments equally unsuccessful; the kittens grew fat on vast numbers of the virulent bacilli.

(5) Strains which were incapable of infecting by means of throat swabbing proved highly pathogenic when injected subcutaneously. In one kitten so treated, and which died on the ninth day, all the pathological changes were confined to the kidneys and suprarenals. The kidneys were enlarged and in section showed marked cloudy swelling of the cells of the cortex and medulla, with enlargement of all the blood-vessels. The suprarenals (not mentioned by Klein) showed a condition of acute inflammation with dilated engorged blood-vessels, and swollen, turbid, indistinct cells in both cortex and medulla.

III.—CRITICAL CONSIDERATION OF AVAILABLE FACTS. (*A*) *Is there a Cat Diphtheria?*—(*a*) The author allows that the work of Klein and others, including himself, conclusively proves that cats are not immune to the toxins of diphtheria when these are directly injected beneath the skin or into the trachea. Also lesions are found post mortem similar to those seen in inoculated guinea-pigs. This, however, does not mean that cats suffer from diphtheria naturally any more than do guinea-pigs. (*b*) "The evidence brought forward from the association of human diphtheria cases with case of illness among cats whose throats are said to show diphtheria bacilli must be regarded as valueless in almost every case: because"—

(1) In all the recorded cases, the diagnosis rests entirely upon a purely morphological similarity between the isolated bacillus and the true Klebs-Löffler bacillus.

In the author's experiments also it was shown that, in no less than 66 per cent. of normal cats, bacilli were isolated which closely resembled true diphtheria bacilli, and the differentiation of which was impossible without isolation and study in pure culture.

(2) The fact that cats may be ill is no real evidence for suggesting that the human and cat conditions are related.

The author quotes two authors who have described cats' illnesses, thus:—

Gray (1896): "The so-called diphtheria in the cat is a contagious disease of the cat, characterised by the presence of diphtheric membranes on the fauces, pharynx, or larynx, and due to some micro-organism not yet determined. The disease has a mortality of quite 90 per cent."

Gofton (1913): "The kidney condition described by Klein as pathognomonic is an exceedingly common condition of the cat's kidney. Affections presenting diphtheritic characters are met with in the cat and occur independently of human diphtheria, but the bacteriological investigations of these infections has up to the present always resulted in failure to demonstrate the presence of the human bacillus."

(*B*) *Are Cats carriers of Diphtheria?*—The author contends that far from cats being able to act as carriers, it would appear from his experiments that the mucous membrane of these animals is particularly inimical to these bacilli.

Dr. Savage sums up his paper as follows: "I am of opinion that, the common and widely accepted view that cats can suffer from a naturally acquired disease caused by the diphtheria bacillus is entirely without foundation."—*Journal of the Royal Army Medical Corps*, December, 1920.

REMARKS ON THE BELFAST REPORT ON METHODS OF KILLING ANIMALS FOR FOOD.

By R. O. P. PADDISON

(*Hon. Humane Slaughtering Adviser to the R.S.P.C.A.*).

The demonstration which forms the subject of this Report, which was published in the February VETERINARY JOURNAL, was the outcome of a recent campaign on the part of the Ulster Society for the Prevention of Cruelty to Animals for the adoption of the humane method of slaughter at the abattoir; to this the Master Butchers' Association and the Journeymen Butchers' Association—the latter comprising the slaughtermen—were very strongly opposed. The humane method consists in effectually stunning every animal by destroying its brain with a humane killer as a preliminary to slaughter. The methods of the abattoir are as follows: Horned cattle (beasts) are first stunned with a hammer or a poleaxe, and then slaughtered. Pigs are first stunned with a heavy balled mallet of lignum vitæ. Sheep, of which larger numbers are slaughtered than all other animals put together, are slaughtered in Belfast in the customary way, without previous stunning.

The associations referred to maintained that the humane method injured the meat, and that the methods customary in Belfast were not cruel. The object of the demonstration and of the investigations and report of Prof. Symmons and Capt. Barry, M.R.C.V.S., was therefore to throw some light on these points with a view to guiding the Markets Committee of the Belfast Corporation to decide what alterations, if any, should be made in the methods of slaughtering animals at the abattoir.

The Markets Committee allowed the S.P.C.A. to be represented at the demonstration, and at the request of the Society I attended, accompanied by Mr. J. R. A. Jones, M.R.C.V.S., of Gloucester, and my demonstrator, Inspector W. J. M. Dadswell. Mr. Jones examined the animals on which the humane killer was used, and found them healthy, in good condition, and in no way inferior, as far as he could judge, to the other animals. Of course we knew nothing of the diet and treatment of the animals previous to their admission to the abattoir, or whether they had recently undergone fatiguing journeys. We were told they had been forty-eight hours in the abattoir, and that all the animals intended for the demonstration had been kept under supervision, and had been fed and treated similarly. Inspector Dadswell used the humane killer, and watched the sticking, bleeding, and dressing, which were well and conscientiously done by the slaughtermen of the abattoir. The Report states that lots were drawn for the allocation of the bullocks, but in view of the findings of the Report, would it not have been better to mention when the drawing took place, and how the lots were drawn? The Ulster S.P.C.A. was represented only at the demonstration, and a request that a pathologist should be allowed to examine the meat on their behalf was refused.

DETERIORATION OF THE MEAT.

Two bullocks, three sheep, and one pig were slaughtered by each of the methods under consideration. To what extent any reliable opinion can be based on such a small experiment is not difficult to determine if one bears in mind the multitude of factors which have their effect on the meat. At all previous trials for a similar purpose, a much larger number of animals were killed than on this occasion. All such tests showed that for the purposes of the meat trader the humane method was not inferior to any other, whether the animals in the latter case were stunned by a poleaxe or other implement, or whether they were slaughtered without being previously stunned. The fact that the method of testing was a novel one was an additional reason for guarding against hasty generalisation. A hint to this effect in a Report serving as a guide to many who are not so conversant with the mysteries of meat as the gentlemen who signed it would not have been out of place.

Bullocks.—According to the finding of the Report, the meat of the two bullocks stunned by the humane killer, and of one which was stunned by the hammer, began to deteriorate on the third day after slaughter, whereas a sample of meat of the other bullock stunned with a hammer is only reported as deteriorating on the seventh day, and the samples taken from the animals stunned with a poleaxe were sound on the eighth day. The difference in the keeping property of the flesh of the two animals stunned with a hammer only illustrates that other agencies were at work besides the method of slaughter. The difference between the meat of the two bullocks stunned with a humane killer and of the meat of the two bullocks stunned with a poleaxe is a more striking illustration of the same point. It is impossible to surmise what causes operated to deteriorate the meat of the animals stunned by a humane killer in three days, but there is no room for the suspicion that the method of stunning them was one of them. If humane killing had such a disastrous effect on the meat of beasts, the large number of butchers throughout this country who have adopted it would be on the road to ruin —if not ruined already. Yet they are practical business men, and no one knows better than they do that the humane killer, as compared with the poleaxe, is no hindrance to their trade. Belfast itself furnishes testimony about the humane killer which tells more powerfully in its favour than the recent experiment tells against it. In October, 1913, I arranged for a demonstration at the abattoir there, and thirty-six beasts were shot with the humane killer on the 8th and 9th. In a letter dated the 14th, the late Mr. Jordan, who was then the City Veterinarian, wrote me as follows : " I am bound to state that the demonstration was a great success. So far as I could judge, all who witnessed it were unanimous that it was a most effective and humane method of slaughter. Your men left a R.S.P.C.A. killer with me, and I shall certainly encourage the slaughtermen to use it." It is obvious by the last few words that the meat of the beasts killed in October, 1913, did not rapidly deteriorate, as it did in 1920. I refer readers to other evidence in the advertising pages of this journal which testifies that humane killing does not injure the meat. And I may remark that it is positive evidence, pointing to a definite conclusion. I suggest that the problem raised by the Belfast Report with regard to the meat of the two beasts stunned by the humane killer is not whether the humane killer injured it, but what actually did injure its keeping quality.

THE BLOOD.

The Report states that all six bullocks appeared to bleed equally well, but that the blood of the two bullocks which were shot was darker in hue than the blood of the others. This, of course, was due to the smaller proportion of oxygen in the blood of the animal which ceased breathing most quickly. But the Report does not mention that the blood which trickled out in the later stage of bleeding was the same colour in all six animals, and equally dark in hue. This is the blood coming from the small blood vessels and capillaries of the meat.

I can offer no explanation of the very unfavourable yield of serum in one of the shot animals, and the moderate yield in the other one. British Animal Products, Ltd., used always to keep and sell the serum and in a report from the manager on the subject, dated November 12, 1917, he wrote, " We got the maximum quantities for each animal."

Sheep.—The Report states : " The keeping quality of the flesh was equally good in all six animals, also that no difference whatever was observed in the quality of the mutton in any of these six sheep." This accords with experience and is also positive evidence.

Pigs.—The summary of the Report says : " The flesh of the shot pig was not in such good condition as the flesh of the animal stunned by the mallet. But on reference to the body of the Report for further explanation, all we find is that five hours after slaughter (4 p.m.) " the carcase was not well set," also " internal fat splashed, striped red in patches, indicative of imperfect bleeding." These details are not evidence against the humane killer. There is nothing abnormal in the flesh not having well set in five hours. As to the splashing, it is well known that it occurs occasionally, no matter what the method of slaughter may be, and is usually ascribed to recent fatigue, bad diet, faulty circulation, or some inherent defect in the pig. This, I think, might have been stated in the Report.

COMPARISON OF THE METHODS OF KILLING.

All the animals shot by the humane killer were instantaneously stunned—their eyes at once wide open and fixed, and the eye-ball insensitive. The same as to the two beasts killed by a poleaxe, one of the beasts felled by a hammer, and the pig stunned with a mallet. The other beast felled by the hammer rolled over on his back, his eyes blinking, indicative of imperfect stunning. He was probably temporarily unconscious, and quickly received a second blow, upon which his eyes were fixed. The three sheep which were killed by the customary method shut their eyes tightly and tucked themselves up on being stuck. No observations were made, to my knowledge, to ascertain the duration of consciousness, which is a very variable factor in sheep thus slaughtered.

Beasts.—The reason why the humane killer is much surer—and correspondingly more humane than the poleaxe and the hammer—is that it is much easier to use effectively and is, therefore, infinitely less dependent on the personal qualifications of the operator. This is not mentioned in the Report, but it is the essence of the case.

The Report speaks of all the men who stunned the animals as "experts." Inspector Dadswell would be the first to disclaim being an expert with a humane killer, as he is no more expert to-day than on the first day he used one. To give the idea—as the Report would do—that the right use of the humane killer requires skill and practice as the right use of the poleaxe does, is quite misleading.

Sheep.—The Report says: "The shot sheep were instantaneously stunned," but "between the two methods there is little to choose from the humanitarian point of view," because in the case of the sheep which were slaughtered without stunning, "unconsciousness very quickly supervened owing to failure of circulation in the brain." But do not the arteries at the back of the neck, which are not severed by the knife, maintain a supply of blood to the brain as long as any circulation continues? I have known corneal reflex persist for two minutes after a sheep had been stuck by a skilled slaughterman. The worst cruelties in sheep killing are caused by learners, as there is no conceivable way by which they can become expert other than by practice on living sheep. The sheep at the abattoir were killed by experts, as the Report states. Yet one of the sheep had to be stuck a second time before the veins were properly cut. In another case, the first attempt to break a sheep's neck was unsuccessful, and a second effort had to be made. Again, a slaughterman, after sticking a sheep, wiped his knife on the sheep's wool before proceeding to break its neck. Sheep make no noise and give little trouble in killing, but they stand in need of the blessings of the humane method at least as much as, and perhaps more than, any other animals.

Pigs.—The stunning of the pig by the mallet could not have been done better; the cruelty of the method, however skilful the operator, lies in the chance of the pig's head suddenly moving whilst the mallet is descending. No such objection exists to the use of the humane killer, as it cannot be fired until it is pressed against the animal's head, at the desired spot. The statement, in referring to the pig which was shot, "We do not consider that this animal was efficiently stunned," is difficult to understand. The eyeball was insensitive from the moment the pistol was fired until the carcase was put into the scalding vat. The City Veterinarian examined the eye when the pig was shot and said "Right," upon which it was stuck and bled. The pig bled very well indeed, after which there was certainly complete anæmia of the brain, and not merely that partial anæmia which the Report advances to bolster up the sheep-killing practices in vogue at the abattoir. The only thing unusual (but not unprecedented) about the pig was the persistence of his nervous vitality, the muscles responding to stimulus nearly ten minutes after being bled. Surely the Report might have explained for the information of the Markets Committee that such muscular activity has nothing to do with consciousness. It can be seen in beef any day many hours after killing. But the Report says that a post-mortem examination of the head revealed that "the pig had been shot too low in the forehead. The brain substance was practically uninjured, save in the extreme forepart of that organ. The brain was covered with hemorrhage." I accept the data revealed by the post-mortem examination, but not the conclusion that the pig had been shot too low, as the data referred to reveal unmistakably that the pig had been shot just where and how he ought to have been shot. Quite the best place to shoot a pig with a humane killer is very low in the forehead, over the extreme tip of the fore part of the brain, as the bone covering is softest there. The slope of the nozzle directs the bullet upwards, causing it to traverse the brain as indicated, hence the hemorrhage. But as the bullet is only one-fifth of an inch in diameter, the brain substance is usually uninjured, except at the spot stated to have been injured, where concussion is caused by the bullet breaking through the bone.

SUMMARY.

The Markets Committee will probably make some attempt to verify the suggestion of the Report that the meat of animals shot by humane killers deteriorates so rapidly. The Report does not state that the method of slaughter was the cause, or even that the carcases concerned were a source of loss to their owners. In the latter direction we might have been given some information, seeing that the demonstration was last October. That the Report neither asserts that the method of slaughter produced the deterioration, nor suggests any reason for the deterioration only indicates that the writers of it are not sure of their ground, which is quite intelligible. I doubt whether it will ever be explained "why humane killing injures the meat," as it would be attempting to explain something false. I am also sceptical whether the owners of the carcases suffered loss or even inconvenience. It has been noticed already that one of the animals stunned with a hammer deteriorated in less than half the time taken by the other one stunned similarly. Whatever the mysterious cause which operated to deteriorate one of these animals in three days may well have operated to deteriorate the two animals stunned with humane killers within the same time. At any rate, we know on the records of extensive experience that the humane killer had nothing to do with it. It was certainly a coincidence that both the bullocks stunned by humane killer should have deteriorated so rapidly, but the coincidence was no more remarkable than another one which occurred in connection with the demonstration. It was current talk at the abattoir in the morning that the humane killer would not be adopted, owing to high feeling which had been notoriously prevalent amongst the slaughtermen against some of its advocates. An effort, however, would be made to replace the hammer as much as possible by the poleaxe. The coincidence I refer to can be seen by anyone who bears in mind the findings of the Report.

I cannot say I am greatly impressed with the impartiality of the Report. Opinion and conclusion is much too rashly laid down, plain facts almost parodied, as in the case of the pig ; the humane points about humane killing ignored and treated with contempt. The Report will be hailed in the old fastnesses of prejudice, but is no use to anyone who wants to better the animal world. Of course there is no question as to the absolute *bona fides* of the writers of the Report.

PRESERVATION OF MEAT BY COLD AND ITS VALUE.

By E. MORGAN, M.R.C.V.S., D.V.H.,
Puerto Cabello, Venezuela.

In Great Britain, as well as other countries, many of the people are prejudiced against meat which has been held in cold stores. This, to a great extent, is due to the erroneous ideas which they have about cold storage methods. Probably many of these originated when the industry was in its early stages, and not so perfect as it is to-day, and naturally then some of the products were found deteriorated in quality. This important branch of meat industry is comparatively new ; nevertheless, there is hardly any other food industry which has made such rapid progress towards perfection in a comparatively short space of time. Since the outbreak of the European war, France and other countries on the continent of Europe apparently have modified their opinions to a considerable extent on the value of chilled and frozen meat to countries like their own. Since the French Government found that it was the salvation of the people during the war they have decided that cold stores are to remain, and are to play an important part in the food industry of France.

Residents in tropical countries prefer to pay a moderate price for cold storage of meat, such as beef, mutton, fowls, fish, etc., rather than to attempt cooking and eating it almost before the animal heat has disappeared.

The meat does not deteriorate from its original value, but on the other hand it improves in quality to a considerable extent, and becomes tenderer and more palatable ; in other words, it ripens, not by means of putrefactive organisms, as is often the case when game, such as pheasants, partridges, etc., are left hanging at poultry shops and larders until their different anatomical parts almost drop apart, but by pure cold air as well as the action of sarcoluctic acid. Frozen and chilled meat, for instance, is carefully handled, also the animals are examined both by ante and post-mortem veterinary inspection. No preservatives of any kind are used, also strict hygienic instructions are carried out until the meat leaves the cold stores; afterwards great care should be taken in handling the meat, as meat, when it thaws, is more liable to be contaminated on account of the moisture formed than fresh meat from newly killed animals. If sound meat is placed in cold stores where the temperatures are properly handled, one gets the meat out when needed in a more profitable condition than when it was stored. Again, if putrefied meat is placed in cold stores one gets it out in the same condition, i.e., as putrefied meat, because it is not possible to destroy putrefactive organisms by cold, but they can be held in a dormant state, but again, when exposed to the open air, seem to be more active than before. This also applies to tubercle bacteria as well as many other pathogenic bacteria when kept at freezing point.

Every moderate sized town should have cold stores; not only from a hygienic point of view is it essential, but also it would be economical. All surplus meat could be deposited at a moderate charge until actually needed. During the summer months butchers are greatly handicapped at times on account of having a quantity of surplus meat in their shops; their only method in the absence of cold stores is the brine tank. Again, during the summer months they could deposit as cold storage their surplus stock of beef and mutton until the winter months, when there is often a scarcity of fat cattle and sheep.

The question is often asked how long will meat last in cold stores without deteriorating in quality. Students of meat inspection are familiar with the answer given, that the Jackutes still feed their dogs on the meat of mammoths which have remained for thousands of years in the ice of the Lena. This obviously means that it will last indefinitely if the temperature is low enough. The danger is in allowing the temperature to rise and fall. If it should go up beyond a certain point the result often is soft meat, and soft meat, if kept only for a short period at a high temperature, means putrefied and mouldy meat when taken out of cold storage in spite of the temperature having been again reduced. Therefore it is most important that the temperature of the meat should be reduced gradually to a certain degree and then held at that point. This applies more so to chilled than frozen meat.

The following extract from the *National Provisioner* of Chicago and New York might be of interest to students of Meat Inspection.

"FROZEN MEAT IN GOOD CONDITION."

"Evidence has recently been produced which proves that meat does not deteriorate when held in cold storage for an indefinite length of time, although it is not the practice of packers to hold meat in storage except for a limited time. The letter containing this evidence was signed by Samuel Rideal, D.Sc., of London, and was addressed to Messrs. Weddel & Co., Ltd. An extract from the letter follows:—

"From the results of my examination of the hind quarter of Queensland beef which was killed in 1896, and which has been in cold store for 18 years, I am of opinion that the beef has undergone remarkably little change during that period. The analysis of the beef tea extracts obtained from this meat are very similar to those obtained from fresh English beef and from Queensland meat killed in 1897 and examined by me at that time after being hard frozen for about four months. This is an indication that the dietetic value of the meat has not been impaired by time. The fibres under a microscopic examination of samples taken from the bullock and rump appeared normal, with a few distorted filaments, such as occur in ordinary fresh meat. Statements to the effect that meat under cold storage for a longer period than a year brings about changes which render it unfit for consumption have been disproved by this investigation. The effect of prolonged cold storage has increased the extractive figures (*i.e.*, the readiness with which the beef gives up its essences in beef tea), but there is no indication of putrefaction taking place at this low temperature, and the meat, even after 18 years, was consumed without any signs of dietetic disturbance."

Clinical.

PHYSIOLOGICAL AND CLINICAL NOTES.

BY MAJOR-GENERAL SIR F. SMITH, K.C.M.G., C.B., F.R.C.V.S.

THE NUMERICAL EXPRESSION OF PATHOLOGICAL LARYNGEAL SOUNDS.

THE sounds produced when any obstruction to the free passage of air to the lungs occurs are of varying degrees of intensity, yet we employ but two verbal expressions to describe them, namely, *whistling* and *roaring*. For the sound caused by certain obstructions, such, for instance, as the swollen pituitary membrane in acute glanders, some employ the expression *snoring*, but this, though well conveying an idea of the sound produced, is confusing, as the term already belongs to a physiological condition. For many years I have thought that an instrument might be invented by which the various intensities of "whistling" and "roaring" could be reproduced and figure values assigned to them. The faintest of all pathological sounds is a slight snore such as is commonly heard when the throat begins to swell, in strangles. It often tells a tale of trouble to come, and the cautious man will not wait for nightfall before seeing that his tracheotomy tube is ready, scalpel handy, scissors and tape available. At the opposite end of the scale is a sound produced in acute asphyxia, which can be heard many yards away; *trumpeting* is the only term which describes it. It is a loud noise such as would be produced by incompletely ligaturing the trachea behind the larynx. Between these two occur all the other sounds caused by inspiratory obstruction. If we call the minimum 1 and the maximum 10, all the intervening sounds should be capable of precise numerical expression. An instrument made on the principle of the larynx, with a mechanism for closing and opening the artificial glottis, should faithfully reproduce all laryngeal and perhaps even nasal sounds; a graduated scale would enable each sound to be accurately expressed. Will some of our mechanical experts give us such an instrument?

How to Study Locomotion.

A horse is walking very slowly when one second elapses from the time that any one leg leaves the ground until it again makes contact, yet during that brief period four limbs have moved. Herein lies the difficulty of watching the action of the legs at a walk. It is, however, easier to watch the movements of the limbs if we limit the field of vision to the legs alone, by cutting off the body. This may be done by holding in front of the eye a card or similar object which obliterates the body and leaves the limbs alone visible. This method may also be employed in the detection of cases of slight lameness. The most capable man may at times be in doubt as to whether the lameness is in front or behind. The trot is a simple pace to analyse, as the legs are used in pairs, off fore and near hind together, near fore and off hind. A horse slightly lame on the near fore may appear to be lame on the off hind, and we only have one rule that I know of to enable us to settle the point, *viz.* :—If the animal appears to be worse on the near fore as compared with the off hind, he is lame of the near fore, and *vice versa.* Of course, I am only referring to cases of slight lameness; very marked cases rarely give difficulty, excepting in those instances when the animal is lame not only in front but also in the diagonal hind limb. The detection of slight cases of lameness is materially assisted by limiting the field of vision as above described. I mentioned this matter many years ago, but have never heard of the method being employed. It should be especially useful for students.

A HORSE "NODS" HIS HEAD AT THE WALK. WHY?

The walk is the only pace at which the horse normally nods the head. The nodding occurs immediately after the fore limb leaves the ground and precisely corresponds with the impact on the ground of the hind foot of the same side. What is the cause of the "nod"? The shoulder is advanced by the levator humeri; the origin of this muscle from the petrous temporal bone and occipital crest would, if it were not counteracted, cause at the moment of contraction an extension of the head and neck with deviation towards the contracting side. Neither extension nor deviation occurs; on the contrary, the head is flexed and the animal "nods." This nodding, which is always present, is most pronounced when the horse is ascending a hill. I cannot think that it is a muscular movement; it appears to be an oscillation of the head. Will those who have divided the ligamentum nuchæ in fistula of the poll, observe whether nodding the head at the walk is in any way modified as a result of this operation? "Nodding" is not essential to the walking pace. If a horse be led behind a cart, in such a position that "nodding" would cause injury to the jaw, the animal can voluntarily control the movement.

PHYSIOLOGICAL AND PATHOLOGICAL ALBINISM.

There are many physiological questions, requiring neither apparatus nor laboratory for their elucidation, which could be solved by the general practitioner. Several years ago the late Sir Jonathan Hutchinson drew attention to the fact that the body patterns produced by white hair were not always symmetrical, and suggested that in such cases it might be suspected that the animal was not symmetrically developed in other respects. He instanced as examples (*a*) a face patch confined to one side, and (*b*) two lateral legs white and their fellows coloured, and supposed it to be possible that this want of symmetry in colour might be associated with a want of symmetry in action or in handiness under the saddle. We cannot afford to put the question aside as unworthy of attention, though probably most of us would say they had observed no such connection. The white areas, whether over the face or the limbs, are due to an absence of pigment in the skin, *i.e.*, to partial albinism. We certainly know that a foot which is "white" is from the point of utility a very different organ from one which is "black."

The skin, feet and nervous system are all developed from the same layer of the ovum, the *epiblast*, so that Hutchinson's suggestion should not be too hastily rejected.

It would appear that the introduction of white into the body markings is the result of domestication. So far as my reading goes the wild horse has no white on the lips or face, though there may be white about the mouth; the hoofs are black. White markings on the limbs are certainly a source of weakness, for undoubtedly the skin of the heel, which in such cases is albinotic, is more liable to " crack " in winter than that of black-legged horses. We may, I think, safely infer that white markings on the limbs are no gain, but it remains to be decided, in terms of Hutchinson's suggestion, whether, apart from cracked heels and weak, brittle feet, white limb markings are in other respects disadvantageous.

There is a rare and curious condition of local albinism, not physiological, which I have occasionally observed affecting the nostrils, muzzle, eyelids, anus, vagina, and under-surface of the tail of the horse. It can be well studied on the anus or vagina in consequence of the absence of hair. The pigment is removed in blotches, as in a form of leprosy in the coloured man. I have never known the blotches to disappear, but I have certainly thought sometimes that the area was larger and sometimes smaller than usual. Where there is hair, it turns white over the affected region. The observant practitioner could decide the relative frequency of this condition. The only point in connection with it on which I can make a definite statement is that it gradually develops on horses not previously de-pigmented. A photograph of a case taken many years ago is reproduced; it shows the eyelids and surrounding area affected. There is also a patch on the edge of the nostril. This animal had also a large patch on the vagina.

Few saddle horses escape the production of white patches on the back. All are due to old injuries produced by undue pressure. They may form without any actual injury to the skin being noticed, but unequal pressure is the invariable cause. Such cases must not be confused with the pathological condition above described. In days gone by a star was considered a point of such beauty that in the event of its absence one was produced artificially by strapping a piece of lead to the forehead and retaining it in position by pressure. Care had to be taken to prevent deep injury or sloughing, but carefully regulated pressure produced a "star." We frequently observe the production of white hair as caused by a tight knee-cap or even by the edge of a tight bandage; this hair never recovers its pigment, any more than in a slight injury to the knees caused by a fall.

To sum up the above we have (1) Physiological partial albinism and (2) pathological partial albinism. Pathological partial albinism is commonly produced by pressure or injury, but in addition there is a distinct form of disease affecting horses, in which injury or pressure is not responsible for the condition of partial albinism illustrated in the above photograph.

WOUNDS WHICH ALWAYS HEAL BY "FIRST INTENTION."

It would be interesting to learn from the pathologist why it is that any incised or lacerated wound of the skin of the eyelid or nostril of the horse will, without antiseptic measures being employed, always heal by "first intention" when the edges are brought together; most clean cut wounds of the face will also so heal, likewise the skin of the ear, provided the cartilage is not affected. This feature enables conservative surgery to be freely practised. In the Army, lacerated eyelids and nostrils are, or were, very common. It is perfectly astonishing how a horse will succeed in lacerating the upper lid, completely through its substance, the eyeball being unaffected; nails and hooks in the wall are common causes of injury. In the Artillery the drivers, while at stables, always wore a hook on the belt, to which portions of harness were attached for cleaning. This hook was a common cause of eyelid and nostril injury, so that an old driver always pushed it behind him when he was grooming a head and forelock. But I have seen very many wounds of the character described which defied their cause being discovered. Many years ago I had a case of a clean-cut wound running from the articulation of the jaw to the anterior edge of the masseter muscle. Not a vessel or nerve was touched, and the most careful investigation of the box in which this horse was standing threw no light on the matter.

A lacerated, dependent eyelid or false nostril looks very unpromising, especially if a day or so has elapsed and the edges are swollen; but the practitioner can undertake their repair with the most positive certainty of union by first intention. If the wound is fresh and clean, it is brought together at once. I always used pin sutures with a figure of eight around them, just drawn sufficiently tight to bring the edges accurately together. Begin at the top, place the parts in apposition and push the pin through, taking a good hold; the pin must come through true or there will be puckering. Three sutures for the eyelid are generally sufficient; for the nostril, as many as the length of wound requires. After suturing the animal must be placed on pillar-reins for a week, but the pins can be taken out on the fourth or fifth day. To ensure success, everything depends on the animal never being left off the pillar-reins for a moment without someone being present, or for a certainty he will rub the sutures out and reopen the wound from end to end. But even in this case we need not despair. The edges are freshened with a sharp scalpel or scissors and the whole process repeated. When a torn eyelid has not been attended to for a day or so, the edges must be similarly freshened before suturing. The part requires no dressing of any kind, no washing, no antiseptic measures, yet union by primary adhesion is invariable. In the case of the ear, if the cartilage is cut the parts curl, union does not occur, and a gap is always left. If the cartilage is not damaged the skin heals by adhesion. In the cases described, the only indication of an operation having been performed is the mark made by the pins, otherwise it is difficult to believe that the part had ever been lacerated.

Hairy Fetlocks and Disease.

Why is it we persist in the production of long hair on the legs of certain breeds of heavy horses? Can it really be that the public believe in the fable of Samson and associate length of hair with strength of body? If the production of this mass of material is of any benefit perhaps some readers of this journal will enlighten me. I believe the growth to be due to the demands of fashion. From a personal point of view it is an eye-sore. It envelops the lower limbs like a dirty doormat and is quite as difficult to clean. It harbours filth and acari and is consequently productive of disease. It has one use which the physiologist can employ: it demonstrates the descent of the fetlock when the weight comes on the limb, for the hair may be seen to touch the ground.

Lameness not Necessarily due to Pain.

Lameness is not necessarily an indication either of conscious pain or of mechanical obstruction. The lessened interest taken in horses during the last two decades may be responsible for the fact that, so far as I know, not once has the extraordinary physiological experiment of Sherrington on the decapitated cat been referred to in any discussion or paper on lameness, yet its bearing on this subject is of the deepest scientific and practical importance. A decapitated cat is unable to stand—one merely decerebrated will stand for days in whatever position the limbs are placed. If, while the preparation is lying on its side, a foot be pinched, the injured part is flexed and the other limbs at once make rapid co-ordinated movements. The animal is endeavouring to escape and holds up the injured limb, precisely as it would do in the normal condition, when it would hop along on three legs, holding up the fourth. It is quite evident that in the decapitated specimen no pain can be felt. The spinal cord is doing the work of protection automatically. Goltz removed the cerebrum from a dog. In course of time the animal was able to walk slowly and stupidly; it was a mere reflex machine, for it had lost its memory, capacity to learn, and the senses of smell, sight and pain. One day, while out at exercise, it injured its foot, and at once it went lame, hopping along with the injured foot off the ground. Applying the experiment to lameness in horses, how can we possibly affirm in the witness-box that lameness is invariably the manifestation of conscious pain? Do not these experiments bear out in a remarkable manner the attitude taken by many men of experience in our profession, who in some "cruelty" cases have affirmed that the animal was not suffering pain? When I started in practice I remember an old practitioner remarking on a case of lameness under examination "He knows how to go lame." At the time I thought he was rather evading the point, but I subsequently saw cases which reminded me of his view. Goltz's dog and Sherrington's cat have convinced me that some cases of lameness in horses may be reflex and unassociated with conscious pain.

POISONING BY IMPURE LINSEED OIL.

By HARRY PEELE, F.R.C.V.S.

(*Durham*).

THE subject of this case was a cart-horse, 10 years old, to which the owner had administered a pint of linseed-oil, obtained from an oil shop, and taken from a six-gallon drum invoiced as "raw linseed oil." It was given to the horse because the animal was going to stay in the stable for the week-end, and the animal was, previous to the administration of the dose, apparently in perfect health. Twelve hours afterwards it was dead, having simply become dull and broken out into a heavy perspiration. There was no abdominal pain or other symptom of illness. A post-mortem examination was not made.

The oil left in the bottle had a distinct odour of paraffin and was sent to a laboratory at Darlington for analysis and report.

The latter stated that it contained at least 75 per cent. of a solvent which appeared to be a mixture of resin spirit and petroleum spirit.

It was a lesson that all linseed oil for administration internally, or even for external use, should always be obtained from a chemist and be guaranteed "pure."

REPORTS ON A FEW CASES.

By G. C. LANCASTER, F.R.C.V.S.
(*Burnley*).

I.

One day this summer a small lad came to the surgery and asked if I would operate on his parrot, as it could not talk.

I could find no account of such an operation in any of my surgical books, but it was suggested to me that it would be the same as some children receive, viz., cutting the frænum of the tongue; consequently I decided to do this to the patient.

Upon opening its mouth I found that there was no distinct frænum. As the tongue was attached all the way across the ventral surface, it was a very difficult undertaking to cut it, because the bird was constantly bending its tongue over on to the sharp edge of a fine scalpel. However, the operation was eventually accomplished, and a few weeks after, whilst walking in the town, this little fellow stopped me and said: "Doctor, our parrot can now talk. It can say '*Poll, pretty poll, Poll, Poll.*'"

I was very much surprised but very pleased to hear the good news, and since then I have operated on three others and all have been successful.

II.

During the summer I have been doing a little experimental work on Roup in poultry, as there has been a large amount of it about here recently.

The temperatures varied from normal to 109.6 and in some cases the eyes were completely swollen up and closed.

Local treatment comprised bathing with a weak solution of Lysol in warm water. In some cases the following medicine was given twice a day. :—

℞.

Spt. Aetheris Nitrosi	ʒ iv.
Liq. Ammon. Acetatis	ʒ ii.
Acid. Carbolic.	*m* xx.
Aquæ	ad ℥ vi.

This was administered by means of a fountain-pen filler, each bird receiving one tubeful, but if very ill, 1½ tubesful.

My last batch of 8 White Leghorn pullets all recovered and did very well. A little pot. perman. was added to the water, and their food comprised ordinary hen wheat and a few dog biscuits soaked in water.

This formula for Roup I can recommend.

III.

At the summer holidays a little cross-bred terrier, about 10 lbs. in weight, was brought to the surgery for board and attendance whilst the owner went away on his holidays.

The owner pointed out to me two large bilateral mammary swellings which she had had some considerable time, but which the owner had been advised not to have operated upon. I just felt them and noticed they were soft, but troubled no more about them. It was put into a kennel and fed as usual, but to my surprise it was found dead one morning. I made a *p.m.* and found that these " mammary tumours " were two large inguinal hernias, each containing a horn of the uterus, which was distended with a nasty reddish fluid. Although only a small bitch, the horns were distended to about 2 inches in diameter.

It was a case of pyometritis and inguinal hernia, the cornua of the uterus having descended and become strangulated.

IV.

On November 30, 1920, a client came to me and said his horse had colic. I found a grey cob, about 15 h.h., 8 years old, in fair condition, with the usual symptoms. It had been taken ill on its way home, so he called at a veterinary surgeon's, inquiring for a colic drink, which was administered. He also gave it a pint of rum. His cob recovered from the colic but would not eat. At one of my subsequent visits the carter drew my attention to its tongue. There were a few cuts on the tip; the centre of the ventral surface extending to the frenum was discoloured nearly black, and the dorsal surface was very hard, except at the tip, which was soft. The cheeks were also a little swollen. I had the parts bathed with a weak solution of pot. perman. and ordered drinking water to be constantly in the manger. I examined the horse again on December 4 and found the discolouring had almost gone, the hard part was softening, and the cheeks were going smaller—everything, in my opinion, going on satisfactorily. On the 5th the owner and carter came down with the end of the tongue wrapped in a paper bag. Whilst examining the tongue, it broke away in their hands for a distance of about three inches.

The horse was found dead on Tuesday morning, December 7, 1920.

The owner bought this horse in 1914. It had been in a stable by itself all the time, except in 1916, when it was turned out to grass for the summer. I made enquiries as to how they had drenched it, and was told that one man held its tongue out with his hand, while the other man poured the medicine down, but beyond that I could get no further history.

V.

Last month a man called at the surgery and said that his horse had colic and he wanted two colic drinks. These were given to him, but I was not asked to see the animal until it had recovered. I found an aged cart. horse in fair condition, and after examination advised light work. A few days afterwards he called at the surgery and wanted the teeth attended to, as it was not eating well.

The horse was dressed and sent away. He had not gone far before he became very distressed. Broke out in a sweat, nostrils distended, and breathing very difficult. I found a sub-maxillary gland slightly swollen, and advised the owner to return to my stables with the horse immediately. This he did, but by 3.30 p.m. the same day it was so ill that I had to insert a tracheotomy tube. The tongue now was very large and hard, hanging out of the mouth for about 4 inches; in fact, it completely filled its mouth. It was given oatmeal gruel and milk to drink and had local treatment to the tongue and head, comprising hot fomentation.

Death from slow exhaustion, after about three days' illness.

Post-Mortem Examination.—The substance of the tongue was completely gangrenous, although there were no lesions on the surface and nothing to suggest that it was in such a dreadful state. Whilst rasping its teeth I remarked and said there was a very bad smell from the mouth, and attributed it to decayed teeth. The teeth were quite good and there were no lesions on the gums. The larynx and upper part of the trachea were also affected.

The owner had had this horse about three years. It had worked remarkably well for him, and this was its first sickness.

INJURIES INFLICTED ON A COW BY A SERVICE BULLET.

By J. F. D. TUTT, M.R.C.V.S., F.R.M.S., F.Z.S.

(*Winchester*).

THE cow in question was grazing in a meadow facing the main railway line, and was shot by a soldier in a troop train in motion, at a range of about 17 yards.

The cow was dead on arrival, and I understood dropped immediately it was shot; made ineffectual efforts to rise, and died within twenty minutes.

Externally, there was a bullet wound on the right side between the last two ribs. Crepitation was plainly heard on palpation, and there was a moderate degree of emphysema.

Internally, post-mortem showed that the bullet took a slanting direction, fracturing the last two ribs at their vertebral extremities, puncturing the lung and diaphragm, entering the rumen, going upwards and tearing the right kidney in half, lacerating the posterior aorta and fracturing the spinal column at the first lumbar vertebra (which was shot to pieces), and embedding itself in the subcutaneous fascia on the left side, almost opposite the point of entry on the right side.

Unfortunately for the owner, the cow was one of the best in the herd and had recently had her third calf.

FRACTURE OF THE LEFT HUMERUS IN A BULL. TREATMENT AND RECOVERY.

By J. F. D. TUTT, M.R.C.V.S., F.R.M.S., F.Z.S.
(*Winchester*).

THE patient was a valuable pedigree shorthorn yearling bull, and sustained a complete fracture of the left humerus, through coming down heavily in a loose box, on October 1 of last year.

Fractures in this position in cattle and horses are difficult to treat, but as the bull was highly priced, treatment was requested.

Bandaging being out of the question, the fractured bone had to be "set" as well as possible by means of strips of linen laid crosswide under and round the elbow joint, and over across the humerus up to the point of its articulation with the scapula. Several layers were required and adhesives, plaster of paris, gum and starch, were all tried in turn, but proved dismal failures (even when shavings were intermixed), the whole mass falling off in a lump within a few hours.

As a final measure, strips of wood (*i.e.*, shavings) were cut, about 8 to 12 inches in length, and an inch in width, and the skin over the affected regions liberally plastered with glue. The shavings were then glued on as in the case of the previous dressings, and a hard, solid mass built up, this being finally well coated with glue.

The bull was allowed to be loose in the box, and this dressing held until early in November, when it came off in pieces.

Examination showed that the bone had set. Prior to setting, the limb could be rotated easily and crepitation heard several yards distant. The underlying skin was denuded of hair, but otherwise undamaged. At present, the bull walks with a slight limp, but this may in time, I think, become practically negligible.

RENAL CALCULUS IN A BITCH.

By FREDERICK HOBDAY, F.R.C.V.S., AND
HAROLD STAINTON, F.R.C.V.S.
(*London*).

THE subject of this note was the Pekingese bitch whose previous history has already been given on page 89 of the VETERINARY JOURNAL for March, 1920.

In August, 1919, she gave birth to one dead puppy and in February, 1920, was operated upon for a cystic calculus. Recovery was uneventful and she enjoyed apparent good health until January 8, 1921, when symptoms appeared quite suddenly.

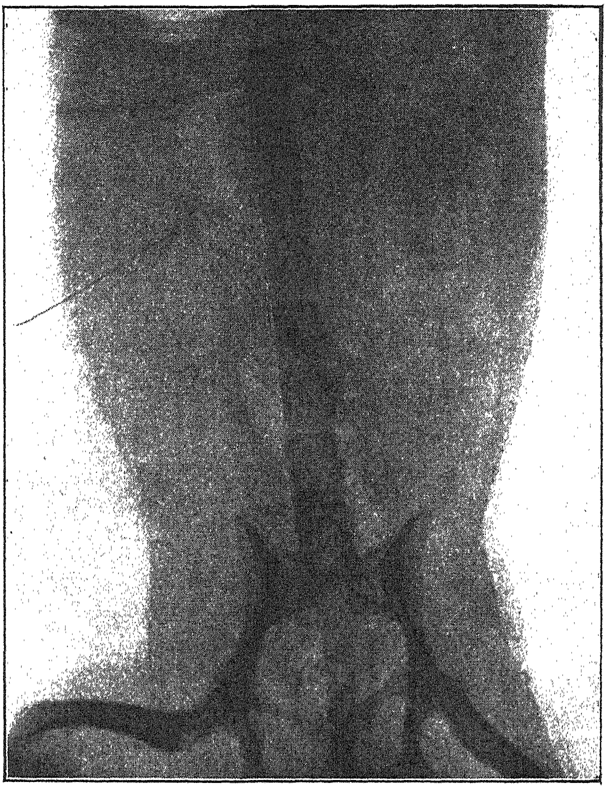
On this date the owner telephoned up from the country to say that the dog was very ill and " needed a dose " as she was " distended and in abdominal discomfort."

On the following day a further telephone message was received to the effect that although the bowels were acting well, the symptoms did not abate. The latter were, if anything, worse, and the dog appeared to be stiff in the hind quarters and walked with difficulty. The back was arched at times and during the night she had had three violent attacks of pain.

On this sparse evidence one was inclined to suspect spinal neuralgia and treatment was prescribed accordingly.

On January 13—that is, five days after the onset of the above symptoms, an urgent message was received to come down and see the patient as matters were getting worse. The symptoms as related by the owner were—intermittent attacks of pain. The bitch would suddenly jump out of her basket, then wander into the middle of the room and stand or sit for a time. She would gradually drop her head and arch her back, retaining this posture for varying periods. Sometimes in the middle of such a period she would throw her head back with a yelp of pain and become rigid. Passage of urine was quite natural. No pain or tenseness accompanied micturition and the urine was normal in appearance to the naked eye. Appetite was suspended, but occasional interest was shown in such food as rabbit. There was no marked thirst. General condition maintained. The dog was placed on the floor and watched. She crawled about aimlessly, apparently selecting cold spots, such as oilcloth, on which to settle. In this connection, it may be noted that any application of heat to the back was distasteful. This had been tried on the previous assumption of spinal neuralgia.

She would sit for a few minutes in a dejected attitude and there was a curious tendency to slowly droop the head and ease up the hind quarters. The tail was almost constantly wagging from side to side in a restless fashion. Movement of the hind legs was very cramped, and examination by abdominal palpitation was negative. The muscular wall was quite flaccid and there was no evidence of any tension or sensitiveness. Digital pressure over the lumbar region, however, immediately produced a cry of pain. This, together with the previous history, led to the suspicion of renal calculus and the owner agreed readily to an examination by Röntgen Ray. Two skiagraphs were taken, one in the dorsal and the other in a lateral position. In this case, a well-defined shadow was only obtained in the lateral position.



Although permission to operate was refused, the case has points of interest as regards its somewhat unclassical train of symptoms.

OBSERVATIONS ON A FATAL EPIDEMIC AMONGST CATS.

By M. WALLACE KERR, M.R.C.V.S.
(*Saffron Walden*).

History.—Cats have been dying off at an alarming rate in this district during a period covering about six months ; isolated farms have lost all or most of their cats and the cause of mortality was regarded at first to be poisoning by gamekeepers and others. This mortality was known to me, but no cats were for some time brought for examination. Cats were dying and being found dead in the town and owners believed they were poisoned. About two months ago the first cat, a great favourite of its owner, came under my attention, and at various intervals up to the time of writing cats have been under my observation and treatment for this disease. The ordinary farm and domestic cat being of little value intrinsically, and veterinary advice unsought in most cases, much information has been lost, but as matters have become serious cat owners have sought veterinary aid for their pets.

Symptoms have been more or less uniform in all cases brought under my notice. The animal suddenly becomes violently sick, vomiting frequently, and there is diarrhœa, salivation, and dribbling from the mouth ; disinclination for company, loss of appetite, surface temperature cold, and rapid general weakness. Breathing rapid at first, gradually becoming shallow and without effort. Heart beat rapid but full pulse ; temperature inclined to be subnormal.

The course of the disease is acute in most cases and if no treatment has been resorted to the animal hides away, preferably in a dark, quiet spot, becoming listless and taking no interest in its surroundings. The eyes become glassy and the eyelids wide open ; the animal appearing blind with a vacant stare. The nose is cold and moist, in some cases sneezing, but no discharge either from nose or eyes. General rapid emaciation in neglected cases and death.

In cats under observation from the outset of the disease the above symptoms have been observed, together with inflammatory lesions in the mouth. The gums in some cases are inflamed, the hard palate has a furred appearance and there is at the back of the throat a certain amount of pharyngitis. In some cases ear trouble has been observed with a discharge from one or both ears ; the outer ear at the base is painful on pressure and resembles canker ; in others no ear symptoms are present.

Differential Diagnosis.—This epidemic might easily be diagnosed as a toxæmia due to bacterial infection or poisoning from arsenic etc. ; as acute gastric enteritis, or as a cerebral affection, from the dull, listless and semi-comatose condition.

It is certainly a very infectious and contagious disease and the cause and origin appear to be unknown.

Therapeutics.—Purely a matter of treatment of symptoms and nursing. I have administered a mild dose of calomel according to the size of the animal, as a powder, on the tongue, followed by

Bismuth Subnitrate	..	gr.1
Cerium Oxalate	..	gr. ſs. (P. W. & Co.)

powdered and mixed with milk or other agent and administered thrice daily according to the severity of the case.

Stimulants, *e.g.*, brandy in milk and egg gruel, meat extracts at frequent intervals, the patient being kept warm, preferably by the fire. Cases have recovered in from two to four days where the above treatment was resorted to in the early stages. The patients gradually became better and will take food voluntarily, such as fish, milk, etc., etc. In neglected and acute cases treatment seems hopeless.

Remarks.—This disease appears to be confined to the cat and attacks cats of all ages, but young animals are chiefly affected. All cats on some farms have died from the disease. Out of six cats on one farm four young cats died and two old cats are still hale and hearty and have not contracted the disease. Some fifty cats have died from the disease in one street alone. Complaints have been made to the sanitary authorities of the numbers of unburied cats which have been found thrown into corners in heaps. The colonising and family characteristics of the cat seems to suggest that the mode of infection is by direct contagion, probably by the mouth. The saliva in the early stages seen dribbling from the mouths of cats in the operation of licking themselves, may spread infection through the medium of the saliva.

Post-mortem Appearances.—The lungs show a patchy inflammation in places, a lobular pneumonia, but lung lesions are very variable; there is little exudate in the bronchi; no pleuritis or pericarditis.

Stomach found empty; in some bile and other secretions are found; no appearance suggestive of gastritis or any gastric lesions.

Liver slightly inflamed with gall bladder distended and extravasation of bile in the region of the duct.

Intestines both large and small are found empty, and no enteritis.

Emaciation in most cases and absence of internal fat. Post-mortem in some cases has revealed the abdominal cavity and internal organs laden with fat, but the alimentary canal absolutely empty; and these cases have been pets and well cared for animals which have been attacked by the disease in a virulent form and have died within 48 hours from the onset.

The ears have been found to contain a large quantity of pus and other deposits resembling canker. Even kittens' ears have been found thus affected where no ear lesions were noticed prior to attack.

The brains have been removed and no cerebral lesions observed. There is, however, an infected condition of the superficial vessels, but no true meningitis.

Research work has been commenced in some quarters with a view to determine the etiology of this disease and one cannot but hope that some practical result will be the outcome.

Abstracts.

USURPATION OF THE TITLE VETERINARY SURGEON.

By MONSIEUR JULES BLIER.

MONSIEUR A. CONTE, in a recent study of professional rights, published by the *Revue Générale le Médécine Vétérinaire* (1) completes the data which he sent to us in 1911 on the practical problem of the usurpation of the title veterinary surgeon. The Court of Appeal, by a decree of June 15, 1914, dissipating the hesitation evinced by certain tribunals " in the appreciation of the conditions of this usurpation," has decided, declares Monsieur A. Conte, that " the empiric who has drawn up his offers in appeals to the public in such a fashion as to lead them to believe that he is in legitimate possession of the title of veterinary surgeon, commits a true usurpation of the title constituting an act of illicit concurrence it is the function of the tribunals to suppress." Since Monsieur A. Conte offers us an occasion for it, it is our duty not to leave mention of this decree of June 15, 1914, without showing thanks to the authority cited in an analogous debate by an illustrious counsel why in fact, in face of the usurpation of the title veterinary surgeon, civil tribunals can evince some hesitation, and why, on the contrary, police court tribunals show none, and above all, how much more from the jurisprudence cited by M. A. Conte, actually more favourable than formerly, we have at our command another juridic arm more powerful still.

When an empiric usurps the title of veterinary surgeon, who are his victims ? It is—and unfortunately veterinary surgeons, who always look at themselves from a too corporative point of view, forget to tell it—at first the client who has consulted the empiric and afterwards—our practitioners should proclaim it loudly—the veterinary surgeon who is the object of the disloyal agreement. What does the latter suffer ? A prejudice which is his alone ; it is exact, but which, in a narrow point, submitted to the impartial examination of a magistrate, does not pass the bounds of private damage and offers no menacing character to society. The hesitation of tribunals formerly, to which Monsieur A. Conte alludes is explained by this particular prejudice to the veterinary surgeon, for the tribunal knows that anybody, save in case of contagious illness, has the right to attend animals, by virtue of the freedom of labour and in the absence of any law against empiricism. What remains ? A damage indisputable to-day, now that the law is fixed, for usurpation of title, disloyal manœuvre, illicit agreement, only raisable before a civil or trade tribunal, capable of carrying a money reparation with the inconvenience of long legal procedure.

The usurpation of the title constitutes a question of penal right Let us return, in effect, to the first victim, *i.e.*, to the client of the empiric. With whom has he done business ? With a man putting on his door, on his prospectus, or on his letter paper the title of veterinary surgeon. Let us analyse this fact. What is this act, which consists in the assumption of false credit, of an imaginary title, to procure by a lying manœuvre an illusory confidence ? This act, as everybody knows, is a misdemeanour ; those who commit it fill the police courts ; they are swindlers. What is swindling ? It is the art of worming benefits out of other people by flashing about an *imaginary* credit. Let us look at article 405 of the Penal Code, which, strange to say, has never been invoked against the usurpation of our title. The Court of Appeal, in its decree of 1914, besides, makes itself understood :—" The general effect of publicity proceedings (of the empiric) has had for its object and result a *clientèle* which has only come to him by reason of the confidence inspired by the usurped title." If a young man seeking a place sends in his card to an employer, writing under his name " Engineer of Arts and Manufactures," without having put foot in the central school, what is he ? He is a swindler.

When in 1911 a Paris swindler was brought up for extracting large sums of money from Sir Horatius Werner, on the plea that he had made a true diamond chemically, the Court did not discuss the fact as to whether the swindler made a diamond or not, but it examined the contract between the parties and found that the swindler had described himself as an " engineer of mines." This was sufficient ; he had usurped the title. The magistrate was more concerned about protecting society against swindling than about giving satisfaction for a particular wrong in private interests.

Therefore, when the empiric usurps the title of veterinary surgeon, or even simply, as noted by Monsieur Conte, " when the impostor, without saying positively that he is a veterinary surgeon, leads people to *believe by the use he makes of this word* that he really is a veterinary surgeon," there are the constituent elements of a misdemeanour, by imaginary credit and manœuvre for arousing in the public a false confidence.

A question remains to be solved. Who ought to make complaint? Not, in our opinion, the veterinary surgeon wronged, or his syndicate, but precisely the veterinary surgeon who has for his mission the representation of the public authorities, which one rightly calls "la Puissance publique," that is to say, the departmental veterinary surgeon whose complaint, based on exact facts, will not only carry more weight with "le juge d'instruction" because he has not to make clients, his personal interest is not menaced by the empiric, and that he carries to the magistrate concerned in the defence of the public from wrong a guarantee of impartiality always appreciated at the pretorium. For the rest, in virtue of the decision of the Court of Appeal, there remains the resource of civil or commercial proceedings.

Observation shows that if the empiric does not always usurp in writing the title of veterinary surgeon, he always usurps it orally. There is, then, one way to follow—to fight empiricism. In our professional assemblies we constantly hear vows made and demands for laws. Do not demand laws—use those that exist.—*Rev. Gén. de Med. Vet.*

TREATMENT OF FOOT AND MOUTH DISEASE.

M. Bertschy and his son noticed in an epizootic of foot and mouth disease in the Canton of Fribourg, that cattle which drank water conducted by an iron pipe, having a length of at least 20 to 30 metres, only suffered slightly when attacked by the disease, but that where the water supply came through cement, wood, ceramic, or galvanised iron conduits the symptoms of foot and mouth were very severe. This led them to think that iron had a specific effect against the malady. Accordingly Bertschy administered 3 to 5 grammes (47 to 78 grains) per animal of sulphate of iron in the drinking water for a period of four to six weeks. All bovines thus treated only contracted minute lesions, two or three vesicles about the size of a pin's head, and appetite and the milk supply remained unaffected.

The authors also have given a dose of 8 grammes of sulphate of iron in physiological solution as an intravenous injection, but this method was too cumbersome for country practice, so they resorted to subcutaneous injections of cacodylate of iron in doses of 1 gramme dissolved in 50 grammes of distilled water. The results obtained on sick animals treated with cacodylate of iron have been surprising, and the authors intend producing a special work on the subject. The authors call attention to the fact that during the war foods rich in iron were reserved for human food and cattle got a reduced supply, and were consequently in a faulty state to resist infection.

J. Mayr and J. Bohm, commenting on the communication of Bertschy, consider that the good effect of iron in the disease is due to the oligo dynamic power of metals on bacteria. Süpfle, Streck, Rosenkranz and Nägeli have shown that the heavy metals (copper, mercury and silver) give oligo dynamic properties to water which are sufficient to kill algæ cells, bacteria and protozoa. Mayer considers that the mode of action of the iron is to produce a strong disinfection of the contents of the rumen.

Mayr in 1895 recommended creolin in the complaint. A dose was given in water three or four times a day, and injections of cresyl were given per rectum.

J. Bohm says :—" It has been shown that iron, copper and silver emit bactericide rays, and that water, glasses, wadding, etc., when in contact with radiant bodies, take on radioactive properties."—*Revue Générale de Med. Vet.*

G. M.

SUTURE OF A SEVERED GASTROCNEMIUS TENDON.

By FREDERICK HOBDAY, F.R.C.V.S.,
London.

THE two photographs illustrate so well the condition of the patient, a terrier dog, eight and a half years old, before and after the operation, that very little descriptive text is necessary.

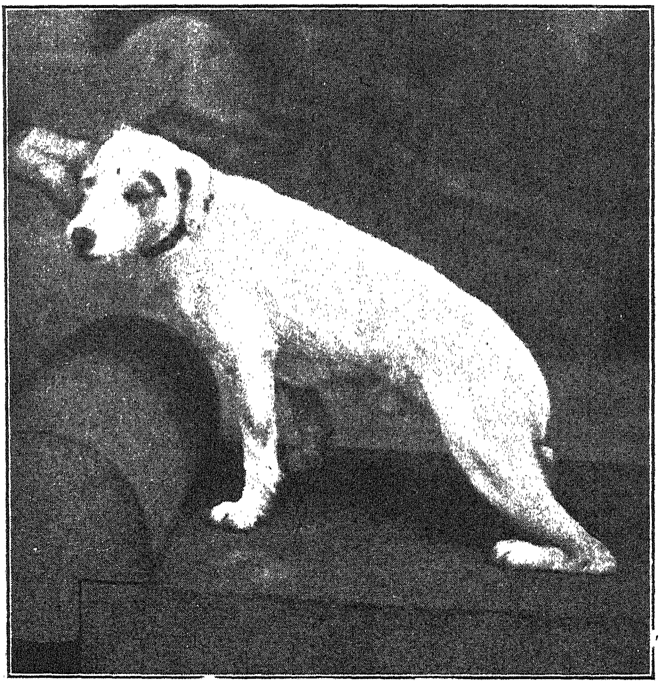


FIG. 1.—Before operation.

The gastrocnemius tendon was completely ruptured, without any apparent external injury to the skin, as a result of an accident, and when the dog was brought to my notice, any attempt at walking brought the tarsus to the ground as shown in Fig. 1. The rupture in the tendon could be distinctly felt. Under chloroform anæsthesia and antiseptic precautions an incision was made longitudinally just over the ruptured area. The two severed ends were then dissected out, freshened up, laid upon one another, and sutured together with kangaroo tendon suture material. The skin was then sutured with silkworm gut in the usual way, and the whole leg placed in a bandage and fixed by the aid of a splint. The bandage was removed and the skin sutures taken out on the eighth day, and, as all appeared to be doing well, the bandage and splint were replaced for another fortnight, when the dressings were all taken off and the dog began to use the leg naturally. For another fortnight or so there was a slight limp, but this eventually passed off, and the leg was used quite as well as the others.

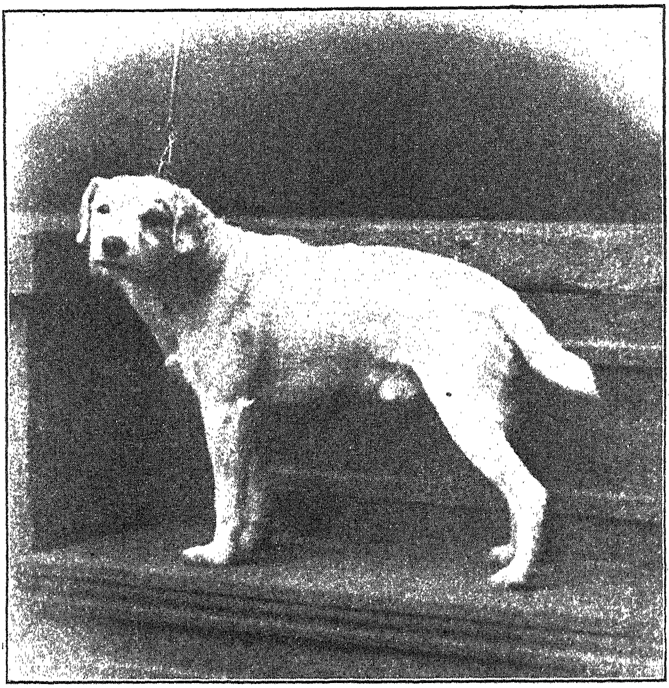


Fig. 2.—After operation.

Review.

ANNUAL REPORT OF THE CAMEL SPECIALIST FOR THE YEAR 1919–20.

THE report of the Camel Specialist, Sohawa, for the year 1919–1920 is interesting, and points to the fact that in the treatment of *Surra* the efficacy of the tartar emetic has yet to be established, and so far remains in the experimental stage. A further report will be awaited with interest.

Artificial inoculation proved fatal, as shown by experiments on ponies, dogs, sheep, rabbits, and guinea-pigs; while buffaloes are shown to be immune carriers, which proves they can act as dangerous reservoirs of *Surra*; and as *Tabanidæ* are frequently seen sucking the blood of these animals, buffaloes must not be forgotten as a probable reservoir of the disease.

Captain Cross, the camel specialist, gives a timely warning of the possible shortage of camels, which it is hoped will be looked into by the military authorities.

BACTEROL.

DURING the past twelve months we have submitted samples of this antiseptic and germicide to prolonged and severe tests as a dressing for wounds in the horse, cow, dog, and cat, and the results have been excellent.

It is stated to be a preparation based upon infusions of eucalyptus and Alpine peppermint, combined with formaldehyde and iodine, prepared and modified by special processes at high temperature.

Diluted and used as directed it proved an inexpensive, efficacious, and clean lotion, having the merit of being pleasant to the owner to apply and non-irritating to the smallest and most delicate animal. It is certainly a dressing that will win its way by its own merits to the confidence of the practitioner and only needs to be tried once to be used again and again.

PROPOSED SECOND INTERNATIONAL CONGRESS OF COMPARATIVE PATHOLOGY.

THE proposed Congress of Comparative Pathology, which had been arranged to take place at Rome in April, 1921, has been indefinitely postponed owing to "International" difficulties. The President, our esteemed colleague Professor Perroncito, explains the reason in the following letter:—

Rome, le 24 janvier, 1921.

Au cours de son travail préparatoire le Comité d'organisation a du reconnaître à son vif regret, que même dans le champ de la science on est encore loin d'avoir rétabli l'entente cordiale qui seule peut assurer le concours de tous les savants qui s'interessent à la Pathologie comparée; de manière à rendre utile et profitable un Congrés international.

Notre Comité voyant l'impossibilité de réunir le Congrès au prochain mois d'Avril; bien décidé d'autre part à persister dans ses efforts tendant à renouer les rapports scientifiques internationaux, sans aucune exclusion, a décidé de remettre le 2^{ème} Congrès international de Pathologie comparée à une époque qu'il espère de pouvoir vous préciser prochainement.

PROF. E. PERRONCITO.

R.A.V.C. OLD COMRADES' ASSOCIATION.

THE above association has now been started and has already proved its value by helping several deserving men and their families who have temporarily fallen on misfortune. The annual subscription of membership, which is only 5s., should be sent to R.S.M. Corr., R.A.V.C., Records Office, Woolwich, S.E., and it is hoped that all who took part in the work of the R.A.V.C. during the Great War, will join up without delay.

The first Reunion Dinner is to be held at 6.30 p.m. on Friday, April 29, at the Café Monico, Regent Street, London. Application for tickets (price 7s. 6d. each) should be made early, as the space is limited and it is surmised that the gathering will be a large one.

Some of the former members of the Lena Ashwell Concert Party, which was so popular in the camps in France, have promised to provide the musical programme, and it may safely be prognosticated that the evening will be a lively one.

NOTICES.

All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C.2. Telephone: Gerrard 4646. Telegrams: "Baillière Rand, London."

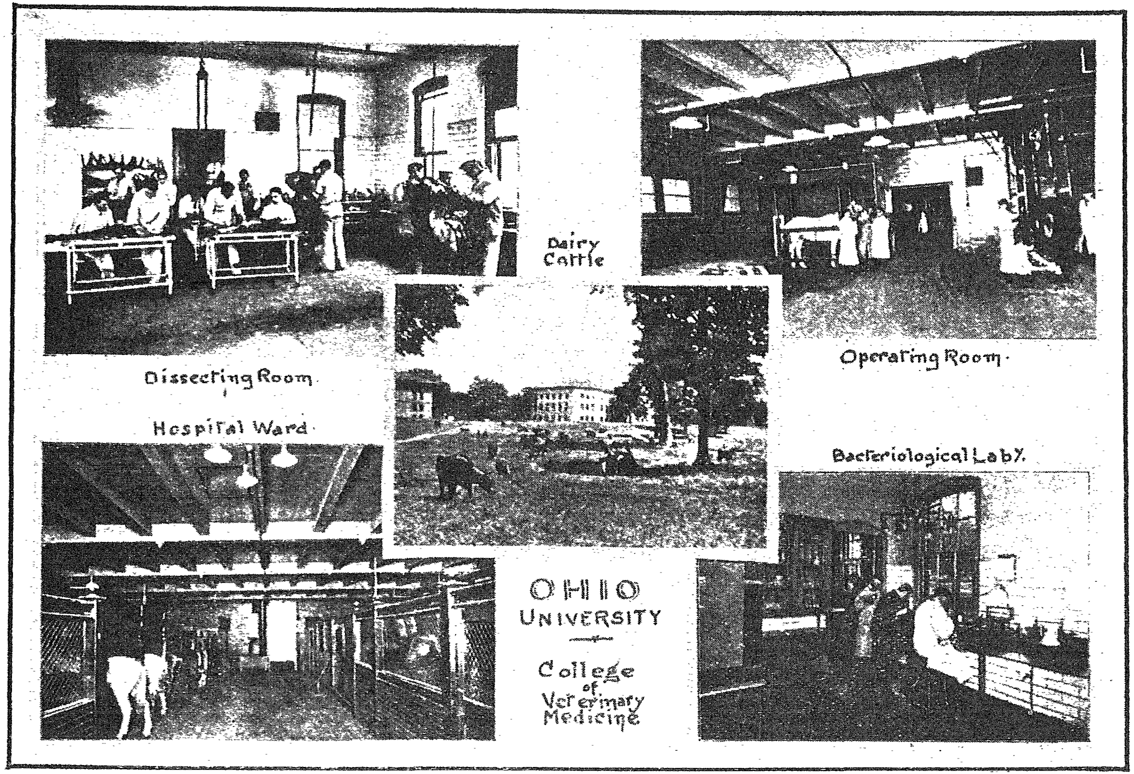
Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editor.

Manuscript—preferably typewritten—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown ink on white paper or card.

Copy for advertisements should be in the hands of the publishers—Baillière, Tindall and Cox—not later than the 25th of the month, or if proof is required not later than 23rd.

Annual Subscription for the British Empire, 21s. ($4.00) post free; or combined subscription with the "Veterinary News" (weekly), 35s., post free.



A UNIVERSITY VETERINARY COLLEGE IN RURAL SURROUNDINGS.

THE
VETERINARY JOURNAL

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Sub-Editor :
GLADSTONE MAYALL, M.R.C.V.S.

APRIL, 1921.

Editorials.

THE OLD HORSE TRAFFIC AGAIN.

ALTHOUGH nothing like the terrible disgrace to Great Britain and the scandal to civilisation that it was some years ago, the "old horse" traffic has again assumed very large proportions, sufficient to induce the daily Press to take up its case and expose its horrors and deficiencies.

The average Britisher loves all animals, especially his horse, and it is only gross ignorance of the cruel treatment it may receive which causes him to sell his old friend and faithful servant to be sent alive across the Channel to be slaughtered in the abattoirs of the Continent; or, worse still, to be resold there for work and slavery such as is not understood (and would not be allowed) in Great Britain.

It is a subject which requires careful handling from every point of view, as no one wishes the adoption of such harsh measures as will prevent such a legitimate traffic as the sale of English horses to the Continent; but what one does wish for is that we shall have the certain knowledge that our horses, who have given faithful service, shall live their declining years in comfort and be assured of a painless end.

It is true that, by the Orders of the Ministry of Agriculture, a veterinary inspector is stationed at every horse embarkation port, with instructions to pass nothing which could not be certified as fit for work in England, and this Order has been of wonderful service;

in fact it may be said to have struck the deathblow to what was known in Antwerp as "England's Shame"—viz., decrepit horse traffic.

A way has recently been discovered for the evasion of the Order by certain cunning, low class dealers, who sent the horses to the Channel Islands, and from there to France, without veterinary inspection of any kind, the laws of the Channel Islands not having been affected by the Order of the Ministry of Agriculture.

That, however, is now altered, and these dealers have been checkmated in this, all animals despatched from the Channel Islands in future having to be inspected and certified "as fit for work in England," as in the case at all other ports. When once the horse is dead the question of the disposal of the meat is purely one of sentiment, and it would be stupid of an Englishman to object to any of his Continental neighbours because they eat horseflesh and he devotes it to less useful and economical purposes. Horseflesh is excellent for human food, and it is often prescribed as an article of diet in the treatment of certain diseases by medical men. In some countries it is more prized than cow beef, and during the war on many occasions fetched a higher price. When, therefore, a young colt meets with an accident which necessitates its destruction, or an old horse has to be destroyed, the flesh is there (if death has been painlessly and properly inflicted) for disposal, and this should be done in the most economical manner possible for the benefit of the community.

At present there is a vast difference in price between the flesh of the horse which has been killed on the Continent and the flesh of the horse killed here—and this is the real inducement which causes the animals to be sent across alive.

What, then, are the objections of the British public to their being shipped across alive? They are two-fold. One is that they are killed by the hammer, pole-axe or knife, and that many of them are not killed at the first attempt. Were they compulsorily killed with the humane killer the matter would be different, for even in the hands of an amateur this instrument, properly applied, never fails to administer instantaneous unconsciousness to its victim. The second objection is that every now and again a vessel gets caught in a storm, or in rough weather, and on these occasions one gets gruesome reports as to the arrival of vessels with many animals severely injured (fractured limbs and wounded bodies), and the deck like a shambles.

These unpleasant contingencies could be avoided if our Continental friends would appoint veterinary inspectors on this side to supervise the killing and subsequent inspection and stamping of the flesh, agreeing at the same time to give whatever is the market price on arrival over there. France has now come into line, and some eighteen British Veterinary Surgeons have been appointed to inspect the carcases on this side. Let us hope that the Belgian Government will see their way to do likewise.

PRELIMINARY UNIVERSITY TRAINING AND RURAL ENVIRONMENT FOR OUR VETERINARY COLLEGES.

In a recent Presidential Address to the Central Veterinary Medical Association—an address replete with constructive and wholesome criticism—one of the main points brought forward was that of the expediency of the establishment of our schools of teaching in an agricultural and rural environment rather than their maintenance amid the artificial conditions of animal life obtaining in great cities.

The President, General Sir L. Blenkinsop, in urging its acceptance, sought to establish this principle rather than to attempt to indicate the means of its achievement. We venture to think there will be few of us inclined to differ with his views on this subject.

Apart from considerations of ways and means, there seems nothing to urge against the expediency of establishing our teaching schools amid surroundings natural and appropriate to the animals with which we have to deal, for it is only in such manner that we can establish and demonstrate the normal standards of health, type, and condition, upon which all our subsequent professional structure of successful animal management and veterinary treatment must be based.

The town horse is rapidly becoming displaced before the ever-increasing uses of the mechanically-driven vehicle, and with the disappearance of "the noble animal" will also disappear the chief surviving reason for the maintenance of the teaching school in the city. If modern breeding principles can evolve the Pegasus able to compete in flying with the airplane and costing less in corn than the latter in petrol, perhaps our old friend the horse will hold his own; otherwise he seems likely—in the town at least—to go the way of the Hipparion and his other forebears.

When Saiutbel in 1792, urged by the farmers of the Odiham Agricultural Association, established the Royal Veterinary College in Camden Town conditions were different. The site chosen for the veterinary school was, if not in the heart of the country, at least a considerable distance from the heart of the town, and the pack horse, the coach horse, and the roadster were upon every highway and byway, forming an essential feature of the life of the people. One, too, greatly outweighing, from an economic aspect, the importance of the ox or sheep, which latter were rarely of such individual value as to demand the services of the veterinarian. The horse was the one animal of importance, and, as all roads led the horse to London, it was reasonable to establish the first school for his study at this all-converging point. Accordingly, on March 22, 1792, a meeting of our professional forebears took place under the presidency of His Grace the Duke of Northumberland—a name even to the present day associated with leadership both in arms and the gentler arts—at which meeting it was resolved "That a temporary stabling for fifty horses and a forge house for shoeing should be built on a piece of ground near Pancras."

Time and circumstance, however, have altered the claims of "Pancras" as the most suitable locality for our teaching school, for the progressive disuse and diminishing numbers of the horse have given place—particularly within the last few years—to considerations forcing into prominence the economic claims of the ox, sheep and pig; animals more essentially rural in their habits and environment than the horse.

It seems a natural conclusion, therefore, if we are to teach our students in the field of nature from the normal as well as the pathological type, that we should arrange for the study of our subjects in their natural environment rather than invert the process in the attempt to "bring the mountain to Mahommed," as we do under our present system of drawing an inadequate teaching material from its normal rural environment and endeavouring to adapt it to the purposes of tuition in the great cities.

They seem to arrange matters better in other countries, both in our own Dominions and in America, for in their universities our profession is accorded its place as one of the learned faculties, and adequate provision is made for the study in a natural environment of all the domestic animals. In problems of animal nutrition and such kindred matters essentially veterinary we have in this country almost completely surrendered our place to others—a fact which reflects as much upon our teaching methods as upon our faulty environment—the one naturally reacting upon the other. Even the most hardened advocate of the system of city education will hardly support the claim that the economics of beef or wool production are best dealt with in the crowded city, or that the principles of profitable pig rearing, or the dynamics of the horse at work, are taught to the best advantage under present conditions; and it is in questions of preventive medicine and general hygiene that the opinion of the veterinarian ought to be acknowledged to be pre-eminent.

In some ways they do these things better in the United States, and we have excellent illustrations both in Cornell (New York State) and in the Ohio State University, U.S.A. In each instance—in a large university of several thousand undergraduates—the veterinary student is adequately provided for in the College of Veterinary Medicine under the administration of its own Dean and College Faculty. *A high degree of general education is necessary at matriculation on a strict parity with the general standard of education required from students entering the other colleges of law, medicine, engineering, etc.* In this way the American university veterinary student starts his college career from the same platform as his medical and legal brother, and so escapes some of the discriminations and invidious distinctions which—under our lower standard of entrance examination—we encounter from time to time in this country.

A four years' course of intensive study follows in all the subjects found in our own curriculum, the student being, in addition, obliged by the law of the State to become an efficient soldier, with all the attendant advantages of the gymnasium and parade-ground training. Such subjects as dairying and animal husbandry form an important part of the third and fourth year courses, and in this way, and amid suitable surroundings, knowledge is acquired of such subjects as "Types and Breeds of Livestock," "Foods and Feeding," "Horse-shoeing," etc., while veterinary jurisprudence and meat inspection fall also within the final year's tuition.

The general impression left upon the mind after studying the detailed synopsis of the four years' course of instruction in either of these American universities is that we in Great Britain have something to learn and much to emulate.

While the technical side of the college training is thorough and comprehensive, and such as enables the graduate to hold his own with medical men in matters scientific, the advantages of skilled instruction in matters of breeding and show-judging enable him from the first to establish his value with the agriculturist, general and broad attainments which are enhanced by the social and physical requirements of university life.

With the question of the expediency of establishing Chairs of Veterinary Medicine at our home universities we are not attempting to deal here, but all must admit the essential advantages of the high standard of general education if we aspire to and would hold our place among the other learned professions. Equally obvious is it that the obsolete methods of yesterday will—unless cast aside in favour of modern methods—inevitably result in our inclusion in the list of "also rans." An antiquated and unsuitable environment for our teaching schools will stultify the best efforts of the best teacher, so that with the passing of the horse, and the increasing value and importance of the study of farm stock, it behoves our authorities to seek, "fresh fields and pastures new."

Biography.

A SKETCH OF THE PAST WORK OF LT.-COL. WATKINS-PITCHFORD, C.M.G., F.R.C.V.S.

By One who knows the Worker.

The recent appearance of South African newspaper opinion in the columns of the Veterinary Journal, and the findings of the Union Senate with reference to Col. Pitchford's past work, have led me, as one having first-hand knowledge, and encouraged by the request of mutual friends, to attempt the following short sketch.

We are familiar with a certain trade advertisement depicting a colossal gas-mantle addressing a British sailor returning from the war with the words "We've both made a good name with the expenditure of very little gas," a sentiment which both points the moral and adorns the tale of the writer in the following effort to sketch briefly the career of a member of the veterinary profession, the practical results of whose work during the past twenty years have, through want of "gas," remained almost unknown, although probably equalling the efforts of any other contemporary or past worker in the same field.

If the subject of this sketch had loved the limelight equally with some of his co-workers there would be no point in the penning of these lines. Distrust of premature conclusions and a dislike of the publicity so essential nowadays to success have operated in the present case to hide the worker's light under a bushel, a result which has been rendered perhaps the more inevitable by a reluctance on his part—after achieving the main result—to spend further valuable time and effort in contesting the claims to priority of subsequent workers, or of endeavouring to countermine rival influences at belittlement.

To have devised the means of bringing under control two of the deadliest animal diseases known is no mean achievement for one worker, but this record by no means completes the tale of Pitchford's successes in the domain of preventive medicine. Scientists of the first rank, such as Prof. Koch and others, had long attempted and finally failed, to devise practical systems of repression for the devastating diseases Horse-sickness, Rinderpest, and the no less deadly disease East Coast Fever. Pitchford showed how the first could be prevented and the two latter successfully and practically eradicated by systems which are in use to-day, systems which have saved in the aggregate the lives of millions of animals.

Writers of personal sketches are, for the sake of effect, prone to the use of too vivid high-lights on the one hand, or too deep shades on the other, exaggerations which it is difficult to avoid where bias, either *pro* or *con*, influences the pen. In referring to "millions," therefore, the writer would wish to avoid hyperbole and leave facts and figures to speak for themselves.

That the loss of horned stock in the South African visitation of Rinderpest in 1896 amounted to many millions was shown by official statistics, and this figure is, of course, but a small fraction of the past toll exacted from animal life in other parts of the world. Rinderpest is now no longer the most malignant of animal scourges, but a manageable disease whose ravages belong to past history. The use of an immune serum—so obvious a line of thought to us nowadays—was then in its infancy, and was restricted to the cure of diphtheria and tetanus only. Within a few months of his arrival in South Africa, months of tense application to the problem, and in direct rivalry with Prof. Koch, Pitchford in the North of the Transvaal, working part of the time with Theiler, had evolved and placed on a working basis the system of serum prevention which is now with hardly any modification the recognised method for the control of this disease throughout the world, the herds of which it had previously scourged since the time of Moses.

The Natal Parliament passed a vote of thanks to the worker, and later the Premier of the Colony stated to the House "that the Government might be trusted, and would not fail when the time came to recognise the great value of the services rendered," etc. But the "time" never came, and Pitchford's friends had much difficulty, some years later, to induce the Government to appoint a Commission of Enquiry to investigate the priority of his work and rescue it from the many—chiefly foreign—claimants which had arisen. The findings of this enquiry established for all time the prior claim of the worker, and re-stated the opinion that the greatest praise was due to the investigator for his brilliant work, conducted often in circumstances of much hardship and difficulty, work the value of which was so great as to merit public recognition.

Such official vindication was all the worker himself expected or hoped for.

The next disease, investigated some years later, the disease which Koch named East Coast Fever, presented somewhat similar features, in so far, at least, as the deadly nature of the malady was concerned, and from the fact that the same three workers (Koch, Pitchford and Theiler) were concerned in the attempt to elucidate the problem, each working separately on different principles. Here also the disease numbered its victims, direct and indirect, by the million, "quickly spreading southward and leaving devastation and ruin to cattle-owners in its wake," as the recent Select Committee of Senators of the Union

Parliament have said in the findings of their report on this disease and its treatment.

The odds, however, were all against Pitchford in this work of enquiry, for the world-famed Koch and his assistants, specially imported from Berlin at great cost, naturally had at command the fullest modern facilities, while Theiler of the Transvaal, with his magnificently equipped laboratory and ample means and staff, "carried all the guns," so-to-speak, in comparison with Pitchford. The latter scientist had to work almost alone in Natal, with such meagre official support that, to ensure economy, he himself had even to assist in the manual work of constructing his dipping tank, an appliance which was destined to give the key to the problem sought, viz., that of the effective suppression of this devastating plague. How he succeeded in solving the problem with the limited resources at his command cannot be told here. A public man, himself an American scientist of note, has referred to the various reports on this subject published by Pitchford over a period of some years as "a monument of laborious research crowned by a brilliant victory."

Although this effort also received the unanimous thanks of the Natal Legislature and many agricultural and other societies, the work itself, as with the previous efforts of the worker, rapidly became so buried under the indifference—or worse—of officialism and its advisers, as to lie unrecognised and unapproved for many years, a state of official torpor which was naturally taken advantage of by the tick which spread the disease, and which, unhappily for South Africa, worked even out of "government hours." The late report of the Senate Committee referred to above, in animadverting upon the policy adopted by the authorities for the repression of the disease, speaks of the "loss of herds, large and small, to such an extent that the northern districts of the Transvaal became almost denuded of cattle," and this Commission, in summing up its mass of evidence taken from the practical experience of many cattle owners, stated that independent enquiry had served to prove that Pitchford's theory was the correct one, and said that "the outstanding evidence of the enquiry" furnished overwhelming proof of the efficacy of the system recommended by Col. Pitchford as the only means to the eradication of the disease."

And so, years after the work was accomplished, another Parliamentary Enquiry endorsed the scientist's efforts in another disease investigation. It is no exaggeration to speak of the practical results of this latter work as bringing about the saving of millions of animal lives and tens of millions of pounds in money value. In ways such as these are the real destinies of a country influenced!

A double success comes to only a few disease investigators, and such are fortunate above their fellows. The tale is not yet told, however, for the three workers previously mentioned attempted the solution of yet another great South African disease, that of Horse-sickness, the cause of the loss in bad seasons of thousands of horses, and in some recorded seasons of tens of thousands. Probably no more baffling disease has ever confronted the investigator, and we still lack a complete and satisfactory solution of the problem. Theiler has done much in the prophylaxis of the disease on the sero-logical side, the possibilities of which line of enquiry had been outlined previously by Edington and later by Koch. Pitchford, however, was able to show the manner in which the disease was contracted, and, as an outcome, to devise a system of protection which has been employed widely over the whole of South Africa with the best practical results. In fact, the essential necessity of a *practical application* has been kept steadily in view in all the investigations of this worker, and the voluminous and technical post-mortem reports and redundant clinical records found adorning—or distending—the reports of other investigators, find no place in Pitchford's recorded work other than to elucidate a point or justify a finding.

Among other minor enquiries by the same worker was an investigation into the alleged possibility of the transmission of the bubonic plague by domesticated animals, a theory causing much controversy at the time in scientific circles. Pitchford's negative findings have since been confirmed by the Indian Plague Commission. A study of the venoms of the various South African snakes led to the production of a polyvalent serum—the first of its kind—which has proved of much use against snake-bite from the snakes of the sub-continent, and in connection with this work a special form of syringe-bottle was devised making the antidote and the instrument for its use inseparable and—a most important point in snake-bite—instantly available. But there is no room here to describe all the smaller enquiries and lines of work undertaken during some 17 years' strenuous work in South Africa. The list below, however, serves to show some of the activities of the scientist who, with no time or inclination to "nibble the ear of authority," or involve his energies in the racial and political elements surrounding him, gave of his best to the State he had engaged to serve—after the manner of the British Civil Servant.

It is not the place here to speak of the causes which forced a man so ripe in past experience and replete with future promise to leave the country he had served so ably; suffice it to state that the scientific worker, on retirement, was accorded merely the minimum retiring allowance the State provided—an amount considerably less than the retiring allowance granted to some of the lay staff of the same department who performed purely clerical duties and were retired about the same time.

Væ victis has too often in the past records of the British Civil Servant become *Væ victor,* and if necessary to the maintenance of Empire, Britons must pass their own children through the fire to the Moloch of political expediency.

"Your investigations and discoveries have been of great benefit to South Africa," wrote the South African Premier (Gen. Botha) when expressing his regret to Col. Pitchford on his departure. Similarly Emperors of Japan have been wont to send polite messages—accompanied with a bowstring—to subjects whose continued existence was inconvenient!

The Natal House of Representatives, agricultural unions, and corporations, etc., passed resolutions of eulogium and thanks to the departing veterinarian. At the annual conference of agriculturists, holding its session at the Town Hall at Pietermaritzburg at the time of Col. Pitchford's departure, the ordinary business of the conference was suspended while the following resolution was adopted with applause :—

> "This Conference desires to place on record its appreciation of the services rendered to this country by Lt.-Col. Pitchford, F.R.C.V.S., in the scientific and practical work he has accomplished. It considers the work done by him in the last 16 years has not only greatly benefited South Africa, but will in the future benefit agriculturists in all parts of the world, and it feels that while South Africa has had the opportunity of following the work done, the value of his services and the utility of his researches may not be widely known outside this continent. It is therefore hereby resolved that this resolution be forwarded to the Government of the Union of South Africa, with the request that it may be brought directly to the notice of the Secretary of State for the Colonies."

Our own Colonial Office, however (which presumably seeks its advice in matters veterinary from another Department of the State), has so far failed to consider the resolution of sufficient importance even to convey its terms to the person most concerned, and the only record of the matter will be found in newspaper reports.

The reflections which such an official attitude raises in the mind are not calculated to inspire the young and ambitious veterinarian with colonial aspirations. Those of greater experience and maturer years, however, will incline to the opinion that the satisfaction of important work successfully accomplished outweighs in the end the satisfaction attending publicity and official recognition. The view of the writer is that a man's work, if of a public nature, should be made public in its results—whether of success or failure—for his friends and his profession have a claim in his successes, while his failures may prove to others as the buoy to the sunken wreck.

The foregoing has been compiled entirely from newspaper cuttings and official reports, and no unattested fact has been included. While this *resumé* has essayed to deal only with the official side of the worker's life, such sketch would, perhaps, be wanting in balance if it omitted mention of activities in directions other than those of the veterinarian and official. Science is too jealous a mistress to allow her votaries to follow other quests too ardently, but in the realm of fiction-writing some of Col. Pitchford's earlier literary efforts were attended with sufficient success to induce his publishers (Ward, Lock) to place several editions of one at least of his works before the public, while his pen has often been employed on subjects widely apart from those of a technical nature. A range of dietetic and pharmaceutical preparations of the most varied character (depending upon the employment of one of Col. Pitchford's patents for the production of a form of artificially digested proteid matter) has of late years been devised and perfected, and promises to come before the public prominently at no distant date. Medical and analytical authorities and the press generally have endorsed the unusual dietetic claims, while the clinical evidence as to a practical utility grows daily.

Such things, however, form no part of the work of the scientist in the larger and more important field of disease-repression which has formed so large a part of his life's work. My intention has been to deal with such matters only in the hope of rescuing some of his official work from the forgetfulness which so readily covers a man's efforts, and especially the efforts of a man who—whatever his accomplishments with other instruments—has in the past shown great lack of capacity to blow his own trumpet. "PALMAM QUI MERUIT FERAT."

EXTRACT FROM THE "NATAL WITNESS," APRIL, 1912.

Some of Col. Pitchford's more recent observations include:—

"The Efficacy of various Disinfectants."
"Natal Snake Venoms and their Action."
"Observations on the Mark VI Service Bullet."
"Copper and its Salts in the Purification of Water."
"Observations on the Bacteriology of Bubonic Plague."
"The South African Disease of Sheep known as 'Blue-tongue.'"
"Observations on the Mark V and sundry patent bullets."
"An Enquiry into the Efficacy of Cattle Dips, etc."
"A Report on Dipping and Tick-destruction."
"The Conformation of the South African Remount."
"The Saddle from the Horse's point of view."
"South African Defence Problems." Etc., etc.

The above form but a small part of articles and publications appearing from time to time in the scientific and public press.

The following is a list of devices, etc., recently brought forward by Col: Pitchford:—

A mechanical compressed-air device for spraying live stock, known as the Natal Spray-pen.
A simple form of Hæglobinometer for clinical use.
An Anti-toxic Syringe for Anti-venomous Serum.
A form of Concentrated Ration for Military use.
A Clinical Blood-tube for estimation of blood cells.
A patent Pack-saddle.
A new design of Veterinary Pannier.
A device for the rapid distribution of anmmunition.
A Water-carrier, Filter, and Purifier combined for Colonial and Tropica use, etc., etc.

General Articles.

THE BREEDING OF SHEEP, LLAMA AND ALPACA IN PERU, WITH A VIEW TO SUPPLYING IMPROVED RAW MATERIAL TO THE TEXTILE TRADES.*

By Colonel ROBERT J. STORDY, C.B.E., D.S.O., F.R.C.V.S.
Arequipa, Peru.

With the mention of Peru there are conjured up in the mind visions of unbounded wealth, mystery and fable; such wealth that the "pots and pans and kitchen vessels were of gold or plate," and such mystery and fable as hides from our ken the origin and civilisation of the great Incaic dynasty.

It is not, however, with the mysterious and fabulous that I wish to deal to-night, but rather with the development of those vast pampa lands which lie between the Cordilleras of the Andes, a development which, so far as I can gather, has never received the attention which its potentialities demand.

Peru, in fact, has never possessed any particular reputation as a stock raising country, and before I left London last year to visit Peru, I was unable to obtain any reliable data as to its possibilities in this direction.

A sojourn of six months in the Republic, during which time I travelled over the entire length of the Southern Railway and visited the vast tracks of country adjacent thereto, enables me to state that the stock industry of Peru, if developed along sound and progressive lines, should prove to be the principal industry of the Southern portion of the Republic. With the advancement of this industry, other avenues of trade will be opened up, and the lands of both Sierra and Cordillera, now sparsely inhabited, become centres of prosperity and wealth.

In pre-hispanic days, the Incas knew naught of horse, mule, ox nor sheep, and it was not until 1532 that importations of the domestic animals of Europe were made by the Spanish. From then until now the introductions of fresh strains of blood have been few and far between, with the result that the once pure-blooded Spanish Merino sheep presents a woefully degenerate picture, so degenerate that the live weight of a full-mouthed sheep—a sheep of four years old—turns the scale at 40 to 45 lbs., produces a fleece of 1 to 1½ lbs., and yields a dressed carcase averaging 25 lbs. in weight.

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*Abstract from a Paper read before the Royal Society of Arts.

With ease the Indian flockmaster slings a sheep on his back to transport it from place to place ; it would be a matter of some surprise were he called upon to carry some of our early lambs to the Smithfield Market.

Apart from the in-breeding, which is the main cause of this retrogression, altitude tends to dwarf the species, and, to keep flocks up to a good standard, the frequent introduction of robust stud animals is essential.

The flock increase, too, is materially affected in the Peruvian highlands, and among the flocks of the natives an increase of only 40 to 45 per cent. is recorded.

Degeneracy, haphazard breeding, want of care and an entire absence of animal management cannot be held to improve matters in this direction.

The wool industry, as one might imagine from what has already been stated, is also in a primitive state of development.

During shearing operations the sheep's four feet are bound together as if it were some cloven-hoofed monster ; in place of shears a knife is used, but, should the knife prove blunt, then a piece of glass suffices. Notwithstanding these crude methods, considerable quantities of wool find their way to the world's markets from Southern Peru, and the wool from the degenerate Peruvian Merino possesses qualities which merit attention and which prove that it is capable of rapid improvement by judicious selection and breeding.

Generally speaking, the climatic conditions of the regions that I have inspected are *prima facie* favourable to the breeding of sheep, as is evident from the fact that sheep have existed there since the middle of the 16th century, and to-day there are approximately 6,000,000 head in the Puno Department of Southern Peru.

Peru, for the present at any rate, cannot hope to compete in the mutton markets of the world, and as the demand for frozen meat grows annually greater, sheep farmers have been encouraged to cross their fine-fleeced Merinos with the carcase-producing English breeds, resulting in a cross-bred wool which, while eminently useful, has to a great extent, lost its fineness and soft handle. Thus the quantity of fine wool grows less and less year by year. The conditions obtained on the Andean table-lands are eminently suited for the production of fine wool, the pasture lands are free of burrs, grass seeds, and other vegetable impurities which militate against sheep farmers in other parts of the world, and which necessitate the application of the expensive carbonising process with its attendant deleterious effects.

Above all, there is an absence of non-preventable disease in the regions of the Sierre and Cordillera, and the Government, under its able and progressive President, is adopting measures to prevent its introduction: as an earnest of those endeavours two experienced members of our Royal College of Veterinary Surgeons are being appointed for service at the Ports of Callao and Mollendo.

The Government of the Republic is fully alive to the advantages which will accrue to the State from the development of its wool and hair industry, and a model sheep farm is about to be established where up-to-date methods of sheep husbandry will be demonstrated, and pure and graded stud animals reared and distributed.

With this in view, a number of Scotch shepherds are about to proceed to Peru, taking with them stud animals of excellent quality purchased from well-known breeders of this country, and a number of Ramboullet rams from the National stud fold of France.

We now turn to a short discussion of the wonderful indigenous hair-bearing animals of Peru, the llama (*ilyama*), alpaca, guanaco (*wanaco*) and vicuna (*vicunya*).

These animals are little known to commerce, and are really little known outside of the Andean uplands of South America.

The aborigines of Peru, according to Garcilasso, looked upon the llama and alpaca as a present from heaven without which they could neither subsist, trade nor travel. In the 12th Century it is said they adored the white alpaca as their principal and presiding deity, offering unto him sacrifice.

In ancient days, the llama and alpaca formed the main meat supply of the Inca population; on the backs of the llama—for the alpaca is never used for transport, but herded in flocks—gold, silver, copper and merchandise were transported over the rough winding pathways of the impenetrable Andes, and its coarse hair supplied the lower classes with the raw material from which they wove their vestments and blankets; even the dried dung of the llama and alpaca provided the only available fuel in those barren regions.

It is a scientific fact that the more poorly a sheep is fed, the finer wool it produces, a truism which finds ample confirmation when one sees fine-fleeced herds of vicuña grazing on the apparently barren slopes of the Andean range.

All members of the species grouse and grumble when handled, and when really angry, spit with unpleasant accuracy. The ejecta really consists of a regurgitation of moist cud, which is violently blown from both mouth and nostrils, covering one with green, acidulous, semi-digested food. The wild guanaco and vicuña are more prone to express resentment in this way than the domesticated alpaca and llama.

The llama is solemn, slow and majestic in motion. The male animal is only used for transport, and is put to work when about three years old. Small packs are used at first, the maximum load of 100 lbs. only being carried when the Indian considers the animal old and strong enough to do so. The baggage llama with its 100 lbs. pack can cover 1½ miles per hour, and a distance of from 12 to 15 miles per day.

The fleece of the llama is thick and coarse, the neck is well covered, but the throat is devoid of long hair; the fleece, terminating abruptly along the bottom line of the trunk, has a staple of from 10 to 12 inches in length, and is used principally in the manufacture of sacks and coarse blankets.

The average weight of the llama is 250 lbs., and it has a life of from 10 to 14 years. The young llama is born into the world during the months of February and March, at a time when the elements of the Cordillera are stormy and bleak, and as little or nothing is done for its protection, there is a mortality which could be greatly reduced were simple animal management observed. The llama carries its young for a period of eleven months, and usually only bears one at a time..

The alpaca is herded in flocks and is driven into stone kraals for shearing. The same haphazard measures as those adopted for sheep are used for the breeding of this valuable animal, and much is yet to be done by selection to breed animals true to type. A cross-breed between the alpaca and the llama has resulted in the production of a hair of good length, lustre and fineness (huarizo), but whether this cross species will create a second generation is yet to be determined. The "suri" type of alpaca, an animal with a distinct curl along the entire length of the hair fibre, is much sought after by the Indian, and is in demand by Leeds and Bradford spinners, for with this naturally curled fibre, cloth of rarity and artistic finish can be manufactured.

The hair of the alpaca is of remarkable fineness and lustre, and there is a variety of colours ranging from white through blue-grey, fawn, and orange to dark brown. These colours show abnormal fastness to light and fastness to milling and finishing operations, and Professor Barker, the eminent authority, states that there is a great future for its use in the manufacture of fabrics for Indian and tropical wear.

There has also been a marked development in the hosiers trade in natural coloured alpaca yarns, and in view of this expansion and the demand for a soft handling fabric, the future prospects for raw alpaca are particularly encouraging.

The annual importation of hair into the United Kingdom from South America amounts to approximately 5,000,000 lbs., of which Peru supplies 3,000,000 to 4,000,000, but until the factories of England can anticipate vastly increased supplies, no new avenues of trade can be opened.

The guanaco is the larger of the two—is russet brown in colour with an overmantle of long coarse hair of slightly darker hue. The guanaco inhabits the highest altitudes and is found in greater numbers in Bolivia than in Peru.

It has never been domesticated, nor has it been used for cross breeding purposes.

The vicuna is antelope-like in shape, and both in appearance, colour and movement, recalls the Gerenuk (Walleris gazelle) of Eastern Africa.

The hair of the vicuna is extremely valuable. It is more estimable than the down of the Canadian beaver or the fleece of the Syrian goat; indeed, it is so valued in commerce that numerous fabrics are to be found labelled Vicuna whose composition consists of nearly all the known raw materials except that from which it takes its name.

The vicuna is exceedingly tractable, and during recent years a few Peruvian farmers have reclaimed it from a state of nature and used if for cross breeding with the alpaca, resulting in the production of a hair which for softness of handle and fineness of fibre will be very difficult to equal. A sample of this beautiful product is exhibited here to-night.

With a view to supplying improved raw material to the textile trades—a material which can only be produced in the Andean regions of Peru and Bolivia—steps are now being taken to farm those valuable hair-bearing animals along proper and scientific lines, and by a process of selection, judicious breeding, and the application of animal management; to retain and enhance the good qualities which they possess, while eliminating those which are deficient or defective, and by a system of cross breeding endeavour to produce a hair of even greater intrinsic value. In short, to place on the market a raw material, sound in staple, of good lustre, soft handle and of standardised length.

Clinical.

TREATMENT OF SOME "COLICS" BY SALINE SOLUTION AND FORMALIN (FORMALDEHYDE 40%), ADMINISTERED BY THE STOMACH TUBE.

By W. W. LANG, M.R.C.V.S.
Brigg, Lincolnshire.

INSPIRED by Professor Imrie, who believes himself to be, if not the first, one of the first, to prescribe formalin internally, also by Mr. E. H. Curbishley's recent paper on "Auto-intoxication complicating serious gastro-intestinal diseases," and by the advocates of hydrotherapy, I tried the above combination for the first time on Christmas Day last. Two days later a communication was received from Professor Imrie stating that he had used the treatment successfully and pointing out an action of formalin, hitherto unknown to me, that of a laxative; ringing the changes on a case of laminitis satisfied me that this view was correct.

The following is a list of consecutive cases, each of which received sod. chlor. ff lb., formaldehyde (40 %) ʒi, aqua gal. viii—only four required a second course of treatment. Any slight variation of treatment is mentioned and where possible a diagnosis is given.

CASE (1).—Colicky pains, profuse perspiration; rectal examination revealed well forward and slightly to the right what appeared to be impacted small bowel. Relieved and feeding in 3½ hours.

CASE (2).—Impacted cæcum, ill all day. Water passed per rectum in one hour and patient feeding; copious evacuation in two hours. Was the early appearance of water in the rectum due to its inability to get into the cæcum?

CASE (3).—Uneasy, hanging back in the stall. Temp. 104° F. Diagnosis doubtful. Feeding shortly afterwards; laxative action in 12 hours. Recovery.

CASE (4).—Examination per rectum revealed impacted double colon. Had been ill and treated all day by owner. Bowels acted normally 3 times in first 2½ hours; patient feeding one hour later; slight laxative action 24 hours; recovery without further treatment.

CASE (5).—Generalised tympany throughout the alimentary canal. Steady and prolonged escape of gas from the stomach through the tube. Recovery steady and uneventful; laxative action in 7 hours.

CASE (6).—Constipation—whatever that may mean. In-foal mare; no pain. Received a second dose in 24 hours; no further treatment required.

CASE (7).—Gastric tympany and colicky pains; rectal examination negative. Steady escape of gas from stomach; recovery gradual; laxative action 7 hours.

CASE (8).—Off feed, temp. 104° F. Doubtful diagnosis. Quite well again and slight laxative action in 12 hours.

CASE (9).—Superpurgation. Had received a pint of linseed oil on two successive days. Usual symptoms with very quick, weak pulse, which was wonderfully improved an hour after treatment. Twenty-four hours afterwards appetite better though fæces still liquid, but lacking the offensive smell. Repeated treatment; following day appetite excellent and fæces normal.

CASE (10).—Three months previously had been treated for cæcal impaction by hydro-therapy. Rectal examination negative, except that small colon contents appeared to be dry. Received the usual treatment but was reported no better two days later. Treatment repeated; one hour and a half later an additional nine gallons of water were given—total 17 gallons. Bowels acted freely during the night and recovery uneventful. This animal had been thin for 5—6 years, but is now quite fat.

CASE (11).—Colicked at market. Treatment as usual. Free from pain in 2 hours and started for home 8 miles distant. Appetite normal on arrival; laxative action 20 hours.

CASE (12).—Down but not in violent pain. Pulse 80 and very weak; temp. 105° F. Diagnosed auto-intoxication and treated accordingly, giving in this case, however, only 4 gallons of water. Three hours later pulse 60, temp. 102° F. Following day, pulse 50, temp, 102° F., so repeated the treatment, giving in addition this time arecoline-hydro-brom. gr. i. No further treatment required; this horse in present owner's hands had always drunk very little water.

CASE (13).—Uneasy. Off feed; pulse 60, temp. 103.4° F. Feeding in 4½ hours; laxative action 12 hours.

CASE (14).—Rolling about, profuse perspiration, tympanitic, diarrhœa, pulse 80, temp. 102.2° F. Failed to find anything abnormal per rectum. After receiving 3 gallons of fluid the patient threw herself on the floor. Had not anticipated this, as gas had freely eructated through the tube; re-inserted tube into the stomach and withdrew all fluid; repeated this with one more gallon. The whole of 8 gallons plus medicinal agents then passed on; twenty minutes later pulse 58; laxative action in 12 hours. Afterwards reported feeding and working all right—rather doubtful.

Sequel.—Attack recurred 9 days later; no tympany; no obstruction to flow of fluid through the alimentary canal; rectal examination negative, except tenderness on the right and dry condition of fæces in the small colon. Repeated the treatment in 2 hours; death following morning. Post-Mortem revealed almost complete invagination of the cæcum, with an inflamed, necrosed and ruptured area near the base; badly infested with strangles.

Assuming that this case, the first seen by the writer, could have been diagnosed, could it have been successfully treated by hydrotherapy? Case No. 10 did not respond in the first instance but did when given 17 gallons, the first 8 of which were cold water, as warm was not available. One wonders whether he had a somewhat similar condition.

If we exclude case No. 14, the only fatal one, we find that only four required a second course of treatment. Also, the experience gained appears to indicate that one can ignore any other medicines given, whether anodyne or purgative, and that the treatment is safe for in-foal mares. One of the earliest signs of improvement apparent to the layman is the return of the appetite, which soon approaches and remains normal—there is no nausea whatever. A slight laxative action takes place at varying intervals, after which the patient is fit for work if required. On the whole it appears to be a very kind and safe form of treatment, and in the writer's opinion bids fair to oust all other methods.

GENERAL REMARKS.

On considering the above treatment all sorts of questions present themselves, beginning with the old query:—What is colic? Also, what are its concomitants? We are told of two—"disordered nervous action" and "disordered muscular action." May we think there is another, viz., more or less arrested glandular secretion? Without this secretion one can readily imagine the alimentary contents of the horse throughout to be nothing other than putrefying vegetable matter, whereas we are told that bacterial disintegration takes place in the large intestines. Here one may ask to what extent this is influenced by the secretions in the preceding part of the canal? On the other hand, we know that many colics subside long before what we believe to be the offending material is evacuated.

What principles are involved in the treatment given above? We are told that sodium chloride "increases secretion of saliva and gastric juice, furnishes hydrochloric acid for the gastric juice and soda salts for the bile," in other words, increased glandular secretion. There is also in the writer's experience a very decided anodyne effect obtainable from the administration of a large quantity of saline solution. Then we have an exosmotic, diluent and preservative action; this last can be proved by the simultaneous administration of either linseed oil or aloes and saline—and this action remains for days after a course of saline treatment.

The formalin was originally given with the idea of its acting as an intestinal antiseptic, but it must be too highly diluted for that. Its virtue may lie in its laxative action in combination with the saline. The author has given ℥i three times a day in water, gall. iv., but whether it has then any antiseptic action is not known. At any rate, the patient gained weight.

LARYNGEAL FISTULA.

BY MAJOR J. R. HODGKINS, D.S.O. F.R.C.V.S.
Secunderabad, India.

THIS sequel to the operation for roaring is apparently very rare.

It is mentioned by Dollar (Regional Surgery) as occurring occasionally.

No instance of it happened amongst the very many animals that the writer has previously operated upon, nor has a case come under his notice.

The subject of the present note was an imported English hunter mare, which, at the request of the owner, was operated upon for roaring.

The operation was simple and the wound healed perfectly up to about the fifteenth day.

After this stage a slight but constant purulent discharge was present from a small orifice leading into the larynx. This would yield to no treatment and carried on the case to the seventh or eighth week. It was then decided to open up the larynx, and to recommence the healing process. The sac was found perfectly obliterated and no reason was discovered for the fistula. The very greatest care was taken in the after treatment of the wound. Again the wound healed splendidly to the stage arrived at previously. It then ceased to heal and the fistulous condition became established. Treatment was carried again into the sixth week without avail. Then, as the discharge was small in amount, it was decided to get the animal fit and work it, notwithstanding the fistula. After a few days at exercise the character of the discharge altered, mucus only being expelled from the opening. At the end of the third week, much to the joy of everyone concerned, the wound closed spontaneously, and the animal is now going very well.

SOME CLINICAL NOTES ON DYSTOKIA OF CATTLE.

BY C. PACK, M.R.C.V.S.,
Lymington.

IN a fairly wide country practice difficult parturition cases form a rather large percentage of the work, and the causes are in many cases interesting.

Not the least difficult are the monstrosities met with amongst "Kerry" cattle, something very akin to the "Bulldog" as far as the head is concerned. The size of this, and the frequently unclosed abdomen, makes it often very difficult to extract, whilst the absence of developed limbs does not help to make matters easier.

I think from observation that the bull is more accountable for this condition of affairs than the female.

In a herd kept for show purposes I met with several cases in succession some seven or eight years since.

In time the bull was disposed of and a new strain of blood introduced, and for the last three or four years I have not had a single case in that herd, although the female progeny have been kept for breeders.

I have never met with this condition in any other breed.

Amongst other cases that have implanted themselves on my memory was that of a Guernsey heifer, a first time calver, unable to calve. Examination proved the legs within reach, but no head to be felt anywhere. Securing one of the forelegs, I succeeded in skinning it to above the elbow, and traction then caused the muscles holding the shoulder-blade to give way. More room enabled me to reach the head and secure it; the calf was then drawn—not at all a difficult case, and the heifer did well.

The next year I was called to the same animal and for the same reason. Examination this time revealed a very different state of affairs, and although the animal had been in labour for some hours I had the greatest difficulty in inserting my hand through the opening to the womb. It appeared to be a large fibrous band in front of the *os*, only just large enough to insert the hand flatwise. The opening then took an upward direction into the womb, and I could feel a foot. I removed the limb in the same manner as on the previous occasion, but that was all of the calf I could extract. I smeared the part with belladonna extract, and as she was fairly strong I left it till next day, but again met with no further success.

I tried day after day, and in time putrefaction set in and I was enabled to get the head and the cervical vertebræ, piece by piece, when matters came to a standstill. Hoping that it might come away in portions, beyond syringing the uterus with disinfectant to lessen the odour nothing more was done. The appetite continued fairly good, and she came into milk. In due time all discharge ceased. No bones were ever known to be passed, and she was sold as a "barrener." The wonder to me is that she survived such a mauling, as others with a twentieth part of such treatment throw up the sponge.

I conclude that the condition at the entrance to the womb was the result of some injury at the previous calving causing thickening and constriction of the parts.

An interesting case of extended pregnancy or delayed parturition occurred in a large heifer of the Gloucester breed, a *prima para.*

About the time she was due for parturition, milk appeared in a well-developed udder, and she gave every indication that she would calve to time.

No calf appeared, however, and, as she was not milked, the milk dried up. The heifer then began to come *in œstrum* regularly, and I was called in for an opinion.

I almost blurted out that the heifer must have aborted and they had failed to notice it, but decided to examine first. The entrance through the vagina was easy, and the mouth of womb closed and normal. Upon examination *per rectum* I could distinctly feel a calf. I advised leaving her to nature, and said I would see her a week later. I did so, but found no change. Two or three days after my visit I received a telegram to say that the heifer was *in œstrum* again, and that perhaps an examination would now be easier. I attended again, with the same result as before. The next day I received a telegram to say the heifer was straining very hard, and asking me to come at once. I attended again, and found that the animal, with some assistance from the dairyman, had succeeded in passing the calf alive; it had, however, died shortly after. This was exactly three months after the date she should have calved, according to the date of service.

No milk appeared in the glands, and the animal was fed for the butcher.

Another case that puzzled me was a small heifer that came into milk when she should have calved, but as the owner was not very certain of the date of service she was left for a week or two, and as in the former case, the milk dried up.

Examining the heifer I found it to be a case of torsion of the womb. I proceeded to try and straighten matters out by casting her and rolling, but to no purpose. It did not matter which way I rolled her my hand was a tight fit. In the end I advised the owner to destroy her. This was done at once, and a post-mortem made, when I found she had been the subject of peritonitis, and that very extensive adhesions of the peritoneal surface of the womb to the surrounding tissues were present. This explained why I was not successful in my attempts, as the womb was a fixture and went with the body as she was rolled over.

RUPTURE OF THE UTERUS IN THE COW.

By LESLIE P. PUGH, B.Sc., F.R.C.V.S.,
Sevenoaks.

Case 1.—A Jersey cow with great difficulty gave birth to her fourth normally-presented calf. Eight hours after she was noticed to be staggering, and veterinary advice was sought, as milk fever was feared. On examination, the cow showed some of the features of this condition. Her temperature, however, was 105° F., she was sweating freely, and about every five minutes she strained violently. Inflation of the udder with oxygen was carried out, and the fœtal membranes then removed. An antiseptic pessary was being placed at the distal end of the right uterine horn, when a rupture of womb was discovered and a large loop of bowel strangulated within the cavity. On touching the same the cow strained violently. Two ounces of chloral hydrate were administered and two c.c. of pituitrin hypodermically. The hand was reinserted into the womb after fifteen minutes, and by careful manipulation the bowel was worked back into the abdominal cavity. The rupture was then found to be large enough to easily admit the hand. Contraction of the uterus proceeded so rapidly that the whole arm was gripped by its walls before being withdrawn. The following day her temperature was 102.8° F., and she appeared dull. Within five days she was milking four gallons daily, and she made an excellent recovery.

Case 2.—A Guernsey cow appeared dull the day following the forced extraction of her first calf. On removing the fœtal membranes a rupture of the roof of the body of the uterus was discovered. After carefully cleansing the womb and mopping dry with antiseptic gauze, a pessary was inserted. Her temperature during the subsequent week did not register above 102.5° F. She, however, persistently refused to feed or drink, and was forcibly fed on gruel and old ale. On the eighth day she died suddenly. Post mortem revealed a perforation of the rectum above the uterine rupture, and this had allowed leakage into the perineal region. The womb had contracted well, and the cow would most probably have made a good recovery if the second injury had not occurred.

CUTANEOUS ŒSTRIASIS IN THE DOG.

By M. H. SOWERBY, M.R.C.V.S., I.C.V.D.,
Bombay Veterinary College, India.

A DOG suffering from a wound on the scrotum was admitted as an in-patient of the hospital in connection with the Bombay Veterinary College on November 2, 1920. No history of the case could be obtained, as the owner did not bring the dog personally, but sent it by a coolie, accompanied by a short note to the effect that if it were curable it might be kept in the hospital, and if considered incurable, destroyed. The dog was not a valuable one, and the owner appeared to be very little interested in it, or perhaps, as seems likely from subsequent developments, the case had been under treatment for some time elsewhere and he was tired of keeping the animal.

About seven days after the dog's admission to the hospital a small swelling appeared on another part of the scrotum, and turned into an abscess in about a week, and when this was opened two or three dead larvæ were found in the evacuated pus. At irregular intervals four more abscesses formed, each following the same course, the first three being on the inside of the right thigh, while the last one, which was opened on December 29, 1920, was on the abdomen, just in front of the penis. These abscesses did not point in the usual manner, but showed a small black spot of necrotic tissue on the surface. My attention was not drawn to the presence of the larvæ by the surgeon in charge of the dog wards until the last abscess was opened on December 29, and I therefore had no opportunity of suggesting that the swellings should be incised earlier in the hope of obtaining living larvæ.

The larvæ obtained on opening the last abscess have degenerated considerably, and their characteristics are not definitely shown. They are 15 mm. long, and appear to be composed of twelve segments and are probably larvæ of Dermatobia Cyaniventris.

CYSTIC CALCULUS IN A FOX-TERRIER DOG DIAGNOSED BY *X*-RAYS.

By J. F. D. TUTT, M.R.C.V.S., F.R.M.S., F.Z.S.,
Winchester.

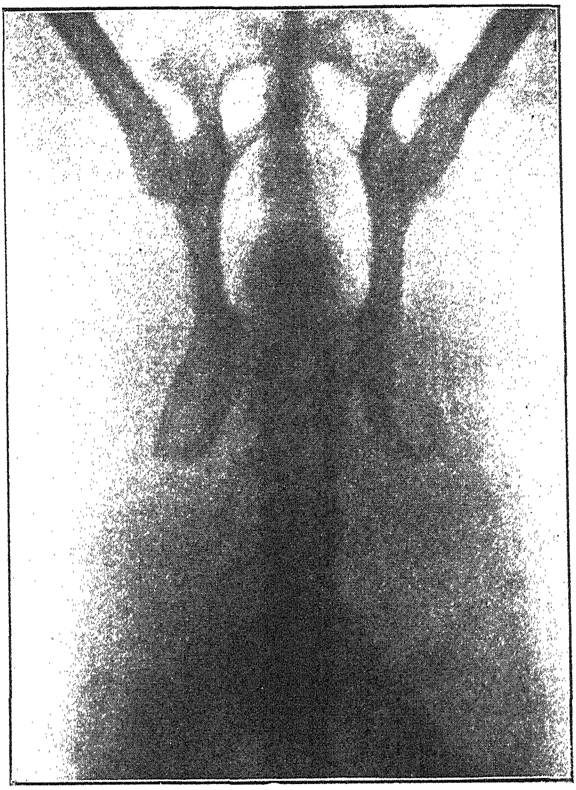
THE patient was an eight-year old fox-terrier dog.

History.—There had been difficulty in micturition extending over a long period. A little blood was passed at times, and micturition was often accompanied by pain, and it was also noticed in the early stages that if the flow was interrupted and the dog shifted its position the flow re-started. This symptom is analogous to that sometimes seen in the human subject in the early stages of calculus formation, the reason being that at this stage the calculus, being small (about that of a pea in size), it tends to be carried with the flow of urine to the urethral exit from the bladder, thus blocking it. Movement often dislodges it, and the flow is resumed.

Treatment prior to X-ray.—The owner stated that the dog had been treated with various remedies for some time, and on a course of Hexamine (*Hexamethlyenetetramine*) a slight improvement was noted. This was transitory, so admission to hospital supervened. Under morphia I was unable to pass the catheter beyond the prostate gland, which could be felt enlarged by rectal examination. It was then thought that this might be the trouble, and a course of potassium iodide was prescribed, and for about three weeks there was a distinct improvement.

This, however, was again transitory, and it was decided to have an *X*-ray examination carried out, and if positive to remove the calculus.

This was carried out by Dr. F. F. C. Jagger, and was positive. The accompanying skiagraph shows the calculus, that of the posterior view being very distinct, where the calculus is plainly visible above the enlarged prostate gland. The vision was, however, much more distinct on the screen. Prior to examination, fasting for 24 hours, with a strong purgative, was carried out. This is essential to empty the bowels, or fæcal matter will " mask " the image and lead to error.



Operation.—The patient received one grain of morphia subcutaneously, and an hour afterwards was placed on the operating table on its back and the supra-pubic area shaved and painted with iodine.

A great disadvantage occurred through being unable to pass the catheter. An incision was made through the skin at the left side of the penis, and through the median line.

The bladder was carefully raised and drawn upwards through the incision, and packed round tightly with sterilised cotton wool to obviate escape of urine into the peritoneal cavity.

The bladder was found to be in a state of acute cystitis, and was incised longitudinally down its centre.

Forceps were inserted, and a calculus the size of a walnut, and weighing 2 drachms 9 grains, removed. After carefully washing out the interior the edges were sutured in the usual way with Lembert sutures, and the skin and abdominal incisions closed by means of interrupted sutures.

A CASE OF THE TRANSMISSION OF SARCOPTIC MANGE FROM DOG TO MAN.

By W. H. COATES, M.B., M.R.C.S., L.R.C.P.
Medical Officer of Health, Patrington, E.Y.

I have recently been reading the lecture given before the Royal Society of Medicine (February 3, 1921) by Professor Hobday upon "Some Diseases of Animals Communicable to Man," and I noticed, amongst others, that canine sarcoptic mange was mentioned. This recalled the fact that, some five years ago, myself and wife, my son-in-law and daughter, and two grandchildren developed this complaint on the lower part of the legs. Only one member of my family escaped, and she never touched the dogs. We caught the contagion from a pug dog, who used to be continually rubbing against our legs in front of the fire.

The rash lasted about six or eight weeks, and was extremely irritable. It was much like lichen planus. My medical colleagues were for some time sceptical as to the cause, but a veterinary colleague, whom we called in to see the dog, diagnosed its ailment as sarcoptic mange and eventually cured it. I myself was convinced at the time that we caught the infection from the dog, and am of opinion that this subject of the diseases of animals communicable to man should receive much more attention in our college curriculum.

ENTEROTOMY FOR A STONE IN THE INTESTINE.

By FREDERICK HOBDAY, C.M.G., F.R.C.V.S., F.R.S.E.
(*London*).

On the 30th of December, of last year, I was consulted by Mr. Wm. Roach, F.R.C.V.S., of Exeter, in regard to a black Pekingese dog (male), $5\frac{1}{2}$ years old, which had (to quote Mr. Roach's own words), "a foreign body in the abdominal cavity in the right lumbar region posteror to the kidney. It can be distinctly felt on examination per rectum, and is freely movable. The action of the bowels and kidneys are normal, and the appetite almost invariably good, but sometimes he is restless and in pain. Occasionally vomiting occurs after taking fluid. Otherwise the little animal is fairly lively although obviously becoming thinner. I enclose an X-Ray photograph, which shows the foreign body distinctly." The history, as obtained from the owner, was as follows :—

"The dog was left apparently in the best of health, at the age of four, with my gardener's wife for a year and a half.

"He had a habit of swallowing stones, but always vomited them up a minute or two afterwards.

"When he returned to me last July, he continually threw up yellow froth every few days, and seemed restless and uneasy at times.

"He did not throw up his food. He swallowed stones once or twice, and was given an emetic of warm water and salt, which immediately had the effect of bringing them back.

"The dog was taken to Cornwall during the month of September, where he seemed particularly well and went for long walks. He seemed in perfect health and spirits.

"He appeared to be very heavy in weight, and I wondered if this was attributable to any condition that was not quite normal.

"At the end of September I noticed that immediately after drinking water he made a whimpering noise as if he was in pain, and as something appeared to be wrong I took him to a veterinary surgeon, who, however, could tell me nothing. He examined the dog internally from the rectum and said he did not like the signs he found.

"Beyond that he gave me no advice whatever.

"I then took the dog to a man in Torquay, who made a very careful examination and said the dog was suffering from gastritis. He gave a dose of calomel, which undoubtedly did the dog good at the time, and which brought away a large amount of bile. The eyes got clearer, and the yellow look disappeared, but his weight went down immediately, and he became thin.

"He did not easily retain his food three months ago, and it was only by the most careful and gentle feeding that he seemed to live at all. We gave him invalid food, such as Benger's, Brand's Beef Essence, etc.

"His spirits were gone. He appeared ill and disinclined to walk, but nothing seemed wrong, that we could ascertain, with either his bowels or kidneys, both of which acted normally.

"The dog gradually became stronger and lives principally on scraped raw beef, with sardines in their oil for the morning meal.

"He does not vomit up his food, and he has been given as little liquid as possible, as undoubtedly at the beginning of his illness it did not suit him. At first he used to like to lick ice. Immediately water or any other liquid is given to him he whimpers as if in pain.

"About two months ago I discovered a swelling or lump low down on the right side, near the groin, and attributed the trouble to this.

"The dog walks slowly and as if in discomfort. For about four or five days he eats well and appears to be going on allright, but he takes bad attacks, refuses food, becomes restless, uneasy, and evidently in pain and discomfort. This generally begins with a bad night of uneasiness, and after a few hours he vomits up, not food, but a most evil smelling dark liquid.

"The lump or swelling appears to shift about. It appears to get across the lower part of the body, sometimes right on the other side, and sometimes it seems right between his ribs.

"A fortnight ago the dog appeared to be brighter, and though very thin at the time, he seemed to be putting on weight. I attributed this to his being able to take a little liquid, such as peptonised milk, but I imagine this was distention, as last Sunday he brought back quite half a tumbler of the foul-smelling liquid again."

I saw the patient at Plymouth on the 12th of January last, and after a complete further examination by Mr. Roach and myself, we decided to make an exploratory laparotomy, having everything prepared for an enterotomy if necessary. The foreign body was freely movable and could be distinctly felt in the iliac portion of the small intestine. The anæsthetic used was chloroform, and the usual antiseptic precautions were taken with the instruments and the skin of the abdomen; the latter not being washed at all but merely shaved dry and painted with Tr. Iodi. Laparotomy was performed through the median line, and the portion of small intestine containing the foreign body brought outside the abdomen.

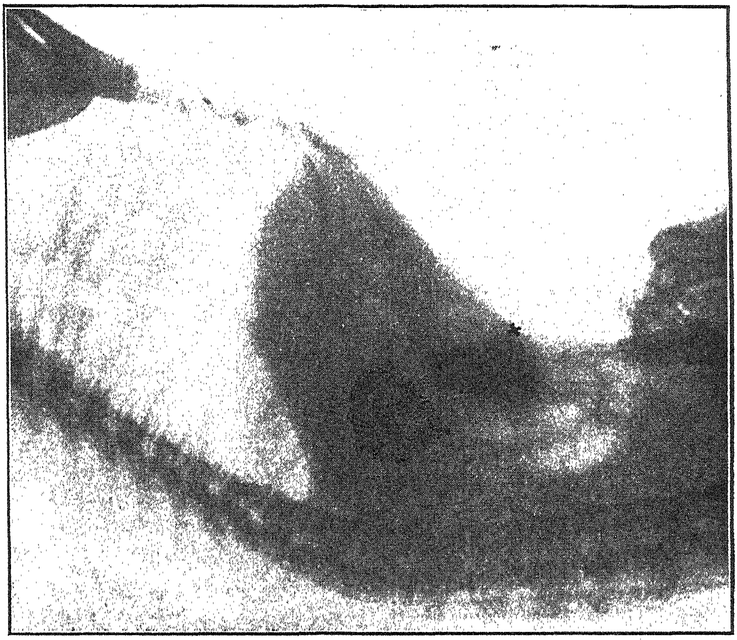
An attempt was made to press the foreign body along the intestine, but it was firmly jammed, and to move it was impossible without exerting undue force, which might have ruptured the bowel.

A site for incision was chosen directly over the foreign body, and as far away from any bloodvessels as possible, the incision being made longitudinally.

The foreign body, which proved to be a stone, was then easily removed, and the wound in the bowel, after being carefully cleansed with antiseptic, was closed with Lembert's pattern of sutures in fine silk, round milliner's needles being used. The abdominal muscles were sutured with silk, and the skin with silkworm gut.

No food was given by the mouth for the first forty-eight hours, predigested meat suppositories (B. W. & Co.) being given every four hours instead; a dessertspoonful of water being allowed by the mouth every four hours too.

At the end of the second day, 60 drops of Bovinine were given every four hours, licked off a lump of ice. This was varied with a little milk, but no solid food was allowed by the mouth for a week. At the end of this time the patient was permitted to take a little sponge cake and sheep's brain alternately, and in ten days, except for a little weakness and the presence of a suture abscess, he was well on the way to convalescence. At no time was there ever any fever to cause alarm, and except for a little minor suture trouble, progress was uninterrupted, and the patient, thanks to the constant night and day care and good nursing given by a devoted owner, and her (if possible) still more devoted maid, made a most excellent recovery.



The stone weighed three-quarters of an ounce, and for the skiagraph I am indebted to Surgeon Rear-Admiral Sir D. McNabb, K.C.B., F.R.C.S. That it must have been swallowed in September is proved by the fact that it was of a variety found on the seashore of the part of Cornwall to which the dog was taken. None of that variety of stone exists in or near the owner's home in Devonport or Plymouth. It must therefore have remained for fully three months in the stomach, causing the slight gastritis and restlessness observed, and then one day have passed through the pyloric orifice into the intestine, where it eventually jammed and caused the obstruction.

Abstracts.

ABSTRACT FROM THE GOVERNMENT OF INDIA ARMY DEPARTMENT.

ARMY INSTRUCTION (INDIA).
No. 1007 of 1920.

DELHI,
14th December, 1920.

1007. FORMATION OF ARMY VETERINARY CORPS, INDIA.

The Right Hon'ble the Secretary of State for India, has approved, in principle, the formation of an Army Veterinary Corps, India, which will combine in one organisation all personnel employed in the veterinary supervision of the animals of the army in India and engaged in their treatment.

2. The corps will eventually include and absorb :—

(*a*) The establishment of officers, Royal Army Veterinary Corps, serving on a tour of Indian service.

(*b*) The British warrant and non-commissioned officers of the Unattached List, Indian Veterinary Corps.

(*c*) The veterinary assistants of the Indian Veterinary Corps, and those serving under agreements extra to establishment until absorbed or otherwise disposed of.

(*d*) The veterinary establishments of veterinary hospitals of remount depots.

(*e*) The veterinary establishment of the Cavalry School at Saugor.

(*f*) The clerical establishment of the Army Veterinary Service in India (provisionally).

4. The other rank personnel of the Corps will be divided into sections, each section being organised as a complete unit to deal with 250 sick animals. The establishment of a section is given in appendix I.

8. Each section will be under the immediate command of an officer, Royal Army Veterinary Corps, who for purposes of discipline and finance will be the Commanding Officer of the section.

Officers, Royal Army Veterinary Corps, appointed to stations or depots where detachments are located, will command such detachments subject to the control of the Officer Commanding the section.

9. Each section will be administered by the Deputy Assistant Director of Veterinary Services of the formation to which the section

is allotted, or in whose area it is situated. This will also apply to those sections or detachments allotted to veterinary hospitals of remount depots.

Similarly the allotment and distribution of veterinary assistants will remain as at present.

13. Two depots, Army Veterinary Corps, will be arranged, one at Ambala to supply units of formations in the Northern and Eastern commands, and the other at Kirkee to supply units in the Western and Southern commands. They will be affiliated to the station veterinary hospitals (class 1) of those stations, and the personnel of the hospitals will form the working staff of the depots. The depots will also have the advantage of the army veterinary schools at Poona and Ambala respectively for assistance in training.

A. SHAIRP, *Colonel*,
Offg. Secretary to the Government of India.

Review.

PROCEEDINGS OF THE ZOOLOGICAL SOCIETY OF LONDON.

In the last publication of the Proceedings of the Zoological Society of London there are several matters of interest to the profession. One is a paper on "The Life History and Habits of the Yellow Dung Fly (*Scatophaga stercoraria*): a Possible Blow-fly Check," by G. S. Cottrell, Esq., with a preface by Professor Maxwell Lefroy, F.Z.S. This is an account of work undertaken to complete an inquiry into blow-fly control, in the hope that it might be possible to utilise the yellow dung fly as a check on the blow-fly in places where this latter is a serious sheep pest.

The manner in which the yellow dung fly grasps its prey, stretching the neck of its victim and puncturing a distinct hole through it, cutting or otherwise damaging the nerve cord so as to cause partial paralysis, has been observed. It has been found that this fly attacked and destroyed as many as a dozen blow-flies (*Musca domestica*) a day in the laboratory, where these were used almost exclusively as food. In the open the yellow dung fly would not, probably, keep up this record, as under natural conditions a great article of its diet appears to be the small Borborid fly, in addition to other Diptera which are not endowed with fast flight. It appears, however, that it specially attacks the Musca and the Calliphora.

With regard to the possible economic value of the yellow dung fly as a destroyer of the blow-fly pest of sheep, Prof. Lefroy says: "The species seems to have much value in this connection, and its habits as a maggot and an adult are so harmless that it is to be hoped it will eventually be made use of."

Mr. Cottrell has studied the question of the best means of transporting the species to localities and countries where the blow-fly is a serious sheep plague. This has not been possible as yet, but the difficulties attending it will, no doubt, be eventually overcome.

Another important paper which appears in the same publication is one by Prof. C. L. Boulenger, in which he describes two new Filarii worms.

I am forwarding the publication to the library of the Royal College of Veterinary Surgeons in order that it may be available to those who wish to refer to it.

HENRY C. WILKIE, F.R.C.V.S., F.Z.S.

Parliamentary.

Question.—Colonel Sir Arthur Holbrook: To ask the Secretary of State for War whether the two Major-Generals of the Royal Army Veterinary Corps who were stated, in the reply given on July 13, 1920, to be employed in Colonels' appointments, will be retained on the active list after they reach the age limit for Colonels of the Royal Army Veterinary Corps, which these two officers reach on May 24 and July 3, 1921, respectively; if so, how the effect on the promotion of officers junior to them will be adjusted, seeing that many of these junior officers performed equally good service, probably under more trying climatic conditions; and if he has considered the effect that the retention of these two Major-Generals would have on the promotion of a very large number of officers junior to them in the Corps.

Answer.—Colonel Sir Arthur Holbrook. Thursday, February 17, 1921. Sir L. Laming Worthington-Evans: It has been decided that the two Major-Generals, Royal Army Veterinary Corps, employed in Colonels' appointments, shall be retired on reaching the age of 57, the age limit of Colonels of the Royal Army Veterinary Corps.

EXPORTATION OF HORSES' ACT.

SIR J. GILMOUR, in answer to a question in Parliament, stated that at the request of the French Government the Minister of Agriculture has nominated eighteen veterinary surgeons to examine the animals and their carcases prior to export.

THE Royal Society for the Prevention of Cruelty to Animals has approached the King of the Belgians and the Belgian Prime Minister, asking that the Belgian Government will do likewise.

Personal.

THE first Reunion Annual Dinner of the Royal Army Veterinary Corps Old Comrades' Association is to be held at 6.30 p.m. on Friday, April 29, when the chair will be taken by Major-General Sir T. Layton Blenkinsop, K.C.B., D.S.O. Tickets, 7s. 6d. each. Morning dress. Apply to the Secretary, R.A.V.C., Veterinary Records Office, Woolwich Common.

Correspondence.

THE CAUSE OF THE "NOD" WHEN WALKING.

To the Editor of THE VETERINARY JOURNAL.

What is the cause of the "nod?" This question has been asked by Major-General Sir F. Smith in the March number of the VETERINARY JOURNAL. It is interesting, especially to one whose time is largely occupied in studying the anatomy of the horse, to try and find out the muscular mechanism which brings about the ordinary movements of locomotion in the horse, and to note the parts played by various muscles in the different gaits. Many of the movements are very complex, and it is extremely difficult to say what really does happen in the musculature, hence, in commencing the study of movement one must try to analyse the simpler movements and component parts of action, such as the nodding of a horse's head in walking.

This slow and easy nodding, with a slight swing from side to side, is, I am sure, nothing more than a rhythmical pendulous movement of the head and neck, assisted, though not altogether brought about, by the action of the extensor muscles of that region—the complexus, splinius, frachelo mastoideus, rectus capitis posticus major, and obliqus capitis inferior—the swing of the head upwards so counteracting the action of the mastoido humeratis which tends to, and finally does, cause the head and neck to swing downwards again, and in this way the natural pendulous swing of the head assists muscular action and lessens the expenditure of energy.

In trotting the limbs move much more quickly, and because of the length of the neck there is not sufficient time in the making of one step for this natural swing to take place, a nod could only occur by the expenditure of considerable muscular energy in hastening the pendulum swing, and so less energy is expended in fixing the head and neck in a certain habitual position for the action of the mastoido humeratis in raising the shoulder.

The question seems to me purely a matter of physics and efficiency in the utilisation of energy, and it would be interesting to note whether the giraffe, with its long neck and necessarily slow head swing, had educated itself up to this "nodding" when progressing at a very slow walk.

E. L. TAYLOR,
2nd Year B.V.Sc. Student.

Liverpool University.

SPLITTING OF THE SOFT PALATE.

To the Editor of THE VETERINARY JOURNAL.

DEAR SIR,—In reading over an article by Major-General Frederick Smith in the February issue of the journal, I notice that splitting of the soft palate is referred to as a new operation. This operation which we have always called staphylotomy, has been performed on this side of the Atlantic for about twenty-five years. It is described in a small manual published by Professor W. L. Williams in 1900, but had publicity in current journals for some years previous.

It is recommended here for pharyngeal explorations, and has been resorted to in several reported cases for evacuating collections in the guttural pouches.

We perform the incision with a curved, hook-shaped knife ferruled to the third finger. The mouth is opened very wide with a mouth speculum that engages the incisors and the knife-armed hand is passed behind the posterior border of the velum and then by a forward movement the incision is made back to the palatine bone.

There is some danger of a large hand tearing the pillars of the fauces as the space is quite narrow. The large hand should therefore be lubricated. By keeping in the median line there is very little bleeding. As the General stated in his communication, it admits of a splendid examination of the whole pharynx, eustachian tubes, guttural pouches, larynx, œsophogeal infundibulum, etc.—Yours faithfully,

L. A. MERILLAT.

Chicago, U.S.A.

NOTICES.

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THE

VETERINARY JOURNAL

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Sub-Editor :

GLADSTONE MAYALL, M.R.C.V.S.

MAY, 1921.

Biography.

THE LATE MR. ALEXANDER INGLIS MACCALLUM, J.P., M.R.C.V.S.

THE name of the late Mr. Alexander Inglis MacCallum will ever be remembered with gratitude by the Edinburgh veterinary student and be coupled with that of his famous predecessor, the late Professor Dick, as one of the most prominent benefactors to veterinary education in Scotland. It is largely by the generous bequests of these two men that Edinburgh can now claim to have a school which stands second to none in buildings and teaching equipment in the British Isles.

Commencing life in comparative poverty, his acquisition of wealth is an illustration of what steady perseverance and determination can do, and his final useful distribution of it in the aid of veterinary education is an example which it is hoped may be copied by others. Born in 1845, at Maybole, Ayrshire, he was apprenticed to a medical practitioner in that town, but after a brief period of this life young MacCallum set his heart upon qualification as a veterinary surgeon. With this object in view he saved up all the money he could and went to Edinburgh, where he entered the Clyde Street College, also carrying on his studies as an apothecary.

In due time he graduated, and then settled down in Edinburgh, keeping a chemist's shop and carrying on the practice of a veterinary surgeon at the same time. His skill and attention to business brought its reward, and his thrift made him one of the richest men in the profession. When the question came up regarding the site and proposed establishment of new buildings for the Royal (Dick) Veterinary College, Mr. MacCallum generously offered the sum of £15,000 towards the endowment of a Chair of Anatomy, and a few years afterwards a further £10,000 was donated. This by no means represents the limit of his help, and the profession, as well as the Dick College, have much to thank him for. For many years, as a Justice of the Peace, he held a seat on the Bench of Magistrates. He was a man whose opinion was much respected and sought after in other ways than in those pertaining solely to the practice of veterinary medicine and surgery, and his name will always occupy a place upon the roll of those who have left the world better than they found it.

Editorials.

ENCOURAGEMENT NEEDED FOR POST-GRADUATE VETERINARY EDUCATION.

POST-GRADUATE education is as essential to veterinary science as to any other, and the time has come when it is an absolute necessity for such to be provided. At the present time the graduates of our profession are very insufficiently catered for in this respect in that very few facilities are provided in the way of research scholarships or other means whereby the impecunious student can afford to gratify his wish. Even where post-graduate courses are provided a man must pay for the entire cost of study and keep himself, during the time this is being taken, out of his own pocket. Unfortunately most of our graduates are poor, and have to depend upon their own exertions when once the diploma has been gained. For the brilliant and persevering student (and we have a fair proportion), desirous of following up original research, pecuniary help is necessary in the form of research scholarships or in other ways, open of course to fair competition.

The medical profession have ample scope in this direction, and it is quite time that we, too, made a move.

The practitioner of to-day is far in advance, professionally, of his predecessor, but veterinary knowledge is ever advancing, and post-graduate teaching should be within the reach of all; and the practitioner of many years' standing should be catered for as well as the recent fledgeling. If brief courses could be arranged at our colleges, to include up-to-date medicine and surgery, and particularly to supply in a brief course of lectures and practical demonstrations the latest mundane things of daily interest to the practitioner, as well as those special points needed for the Public Health Services at home and abroad, there is no doubt that the profession would give a liberal response, which would adequately remunerate those who taught and add knowledge to those who sought it.

THE NEED FOR CLOSER COLLABORATION BETWEEN HUMAN AND VETERINARY MEDICINE.

One cannot help but be struck by the more constant allusions lately, by members of both professions, not only in the Press but at our scientific and social gatherings, of a need for closer collaboration between human and veterinary medicine. In last month's issue the medical officer of health for a district in Yorkshire, writing on a case of canine sarcoptic mange affecting a family, and definitely stated to have been communicated to them from a pet dog, stated that in his opinion medical students should receive special instruction on the diseases of animals communicable to man.

The two combined meetings of the Royal Society of Medicine and the Central Veterinary Medical Society have given ample proof of the value of such collaboration, and in the after-dinner speeches of the last meeting of the Lancashire Veterinary Medical Association the subject was plentifully alluded to. Professor Dean, of Liverpool University, assured the members " that they in the medical profession valued nothing better than to work in close harmony with the members of the veterinary profession," but Professor Yorke (of the Liverpool School of Tropical Medicine) stated that " he was becoming more and more impressed with the fact that the two branches of the one profession did not work sufficiently in harmony. They met on occasions like that but not in their daily working." It is the latter paragraph which should receive most attention and consideration, quite as much on the part of the medical profession as ourselves, for the medical branch (especially the Public Health Department) does not yet realise what it is missing by not encouraging a closer collaboration. Mr. McKinna, ex-President Royal College of Veterinary Surgeons, also at the Lancashire meeting, hit the nail on the head when, in complaining that " he did not think sufficient harmony existed between the two branches and he felt they ought to get in closer co-operation with the medical profession," concluded his speech with the remark, " and that medical officers might ask their advice more often." It would certainly help the common fight against disease if this was done and it is up to us to do all in our power to further the object from our side by keeping ourselves abreast of the times, both in our theoretical reading and practical application. Every branch of the profession can, if it will, find daily value in this collaboration, and each individual member can, by his own example, do much. The " watertight compartment " day has passed. Let us therefore prepare ourselves for the future, as in Veterinary Public Health (and this means closer collaboration with human medicine) lies one of the biggest outlooks of the profession. The protection of the general public from the ravages of diseases such as glanders and rabies, diseases which can only come to mankind from animals, depends entirely upon the vigilance of the veterinary profession, and neither the public nor the medical profession as a body have fully realised this. Perhaps we, as a profession, work too silently or modestly. Certainly we do not assert the importance of our work as vigorously as we might do, and a little more knowledge on the part of the general public would also be beneficial to the progress of our profession.

DEVELOPMENT COMMISSION.

Advisory Committee on Research into Diseases of Animals.

An advisory committee has recently been appointed " to report on the facilities now available for the scientific study of the diseases of animals, to indicate what extension of those facilities is desirable in the immediate futute in order to advance the study of disease (whether in animals or man), and to advise as to the steps which should be taken to secure the aid of competent scientific workers in investigating diseases in animals."

The Committee consists of the following gentlemen :—

Lt.-Col. Sir David Prain, C.M.G., C.I.E., LL.D., F.R.S. (Chairman).
Professor O. Charnock Bradley, M.D., D.Sc., M.R.C.V.S., F.R.S.E.
Capt. Walter Elliott, M.C., M.P.
Sir W. Morley Fletcher, K.B.E., M.D., F.R.S.
Major-General Sir William B. Leishman, K.C.M.G., C.B., F.R.S.
Sir John W. Frodyear, M.B., B.Sc., M.R.C.V.S., LL.D.
Professor Charles J. Martin, C.M.G., D.Sc., F.R.S.
Mr. F. B. Smith, C.M.G.

Numerous witnesses are to be examined, and it is to be hoped that the result will be of benefit to the profession in the way of encouraging facilities for research.

General Articles.

DOMESTIC ANIMALS AS A FACTOR IN THE SPREAD OF INFECTION.*

By WILLIAM G. SAVAGE, B.Sc., M.D. (Lond.),
Medical Officer of Health, Somerset C.C.

Real progress in the prevention of the spread of infectious diseases —using the term in its widest sense—can only be attained by an extension of exact knowledge as to the paths and methods of infection and the factors affecting the resistance of the individual. This truism is worth restating since it is so frequently neglected in practice. The present discussion only deals with one small aspect of this huge problem, but it is one upon which we need to come to clear and definite conclusions and to decide precisely to what extent, and how, domestic animals are factors of spread of infectious disease to man.

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* Abstract from the Journal of the Royal Sanitary Institute.

It would be impossible for me to give even a general survey of the subject in the time at my disposal. Tuberculosis alone could occupy us for a day, so I propose to take three examples of alleged association between human and animal disease, leaving it to others to discuss other aspects of the subject. They are selected because I have devoted many years of investigation to them, and illustrate very well the need for exact knowledge which can only be acquired by prolonged investigation.

BOVINE MASTITIS AND HUMAN DISEASE.

Mastitis in cows is a rather common condition, and it is important to know definitely how far it is a menace to health. My own investigations and those of other observers show that it may be caused by a number of different bacteria. The chronic form is usually due to the tubercle bacillus or less commonly to actinomycosis. There is considerable discrepancy amongst authorities as to the prevalence of cows with tuberculous udders. There are evidently considerable differences according to the district. Probably the average prevalence is about 1 per cent. This is the most important source of tubercle bacilli in milk and a potential cause of human tuberculosis.

The association of the acute variety with human disease is far less direct, and has required a good deal of unravelling. Of 35 acute cases which I investigated very thoroughly for the Local Government Board in 1907-08, over 70 per cent. were due to streptococci, the remainder being due to staphylococci (over 16 per cent.), one to *B. coli* and the others were of doubtful bacteriology. The point of practical importance in the present connection is the extent to which these streptococci and staphylococci are capable of causing human disease when ingested in raw milk. Since it is by no means infrequent for the milk from animals affected with acute mastitis to be added to the common supply and used for human consumption, I made an extended study of the streptococci from mastitis cases. The *streptococcus mastitidis* very closely resembles the pathogenic streptococci of man, as found in cases of sore throat and from other sources, in morphological and cultural characters, but in my experiments differed in pathogenicity. This bovine type was of low virulence to animals but readily set up mastitis in goats. The human strains possessed considerable pathogenicity for laboratory animals, but 13 out of 15 strains were unable to produce mastitis in goats when introduced by way of the teat canal. The remaining two strains did produce some degree of mastitis in the goat. These results showed the striking and distinctive fact that there was an essential difference of function separating the two groups, and that it could be deduced that under ordinary conditions the *streptococcus mastitidis* is not a cause of human disease. So convinced was I of the accuracy of this deduction that on two separate occasions I infected my own throat with massive doses of this streptococcus, isolated only a day or two previously from cases of cow mastitis. On both occasions no ill effects were experienced constitutionally or locally, and the streptococcus could only be recovered with extreme difficulty from my throat, showing that it was a type of organism in an alien habitat.

While my extended investigations conclusively demonstrated that the ordinary case of bovine mastitis was not a cause of human disease, it left unexplained the undoubted fact that from time to time extensive outbreaks of sore throat and other septic conditions had been traced to milk infected from cows suffering from mastitis. In my book on "Milk and the Public Health," published in 1912, I summarised particulars of over 20 outbreaks of these diseases due to milk, in a good many of which the cause was traced back to cows suffering from this condition, while in 1905 I had described in detail, and fully investigated, such an outbreak involving over 600 cases and definitely traced to such an infective cow.

I was able to supply an explanation of this apparent inconsistency. While I found that *streptococcus mastitidis* was the usual organism of bovine mastitis, it was not the only type of streptococcus associated with this condition. In one case, for example, a streptococcus of extremely high virulence to rodents was found to be the cause of the mastitis, and of a type distinctive from the *streptococcus mastitidis*.

In a paper I read in February, 1911, before the Epidemiological Section of the Royal Society of Medicine I advanced the view that the ordinary type of bovine mastitis is due to organisms non-virulent to man, but that in certain uncommon cases this condition is caused by streptococci highly pathogenic to man. In the same paper I propounded the hypothesis that the cases in which this type of organism occurred were examples of infection of the cow from a human source. To quote my words: "Briefly stated, I regard the bovine udder and teat lesions, as commonly met with, as of purely bovine origin and, as such, harmless to man. Occasionally, either as an invasion superadded upon the original bovine lesions or as a primary infection of the milk organs, there is a local infection with organisms of human origin. In such cases the conditions present may be decidedly prejudicial to man. In other words, the cow, in this class of infection, is only potentially pathogenic to man when it acts as an active or passive carrier of organisms of *human* origin."

These investigations and views were contained in papers written between 1907 and 1911. At that time there were no recorded outbreaks of sore throat, etc., reported in America, but in 1911 and subsequent years a number of extensive outbreaks occurred at Boston, Chicago, Baltimore, and other cities which led to an extended series of careful investigations in America which are of great value and have considerably increased our knowledge. They have, for example, been able to further differentiate the human type of streptococcus in bovine mastitis by means of hæmolytic tests, and have shown that the strains dangerous to man are always hæmolytic, while the streptococcus of ordinary bovine mastitis is non-hæmolytic. Davis and Capps have shown that hæmolytic streptococci of human origin may cause mastitis lasting for several weeks in cows, this time roughly corresponding to the duration of milk-borne epidemics. The streptococci may gain access from an infection from the milker, whose hands are contaminated, perhaps, from a sore throat.

By means of the tests advocated by me and these additional tests it is possible to state with reasonable exactitude whether particular strains of streptococci isolated from the udders of cows are of the human pathogenic type or of the comparatively harmless bovine type.

In an outbreak in Boston in 1917 (reported January, 1920, by Brown and Orcutt), it was possible to identify the particular infective strain both from the mastitis fluid and from the sore throats of the sufferers. An endeavour was made to trace the source of infection of the cow, and this particular strain was isolated from the throats of a number of the employees of the dairy, but the data was insufficient to connect any one of these individuals definitely with the infection of the cow.

These American results afford very striking confirmation of the hypothesis described above, enunciated from my own investigations, and long before any of the American work was carried out. The precise relationship of this condition to human disease may now be said to be worked out fairly clearly.

FOOD-POISONING—OUTBREAKS AND DOMESTIC ANIMALS.

We now possess fairly exact knowledge of the relationship of unsound food conditions to individual cases and extensive outbreaks of food poisoning, but this knowledge is not widely disseminated, while certainly it is not usually acted upon in administrative work. It is therefore worth while defining clearly the present stage of our knowledge.

We may accept it as definitely established that all, or almost all, the outbreaks involving groups of persons and probably most of the smaller outbreaks involving only a few individuals, are due to an infection of the food eaten with members of a particular group of bacilli, the Gaertner group, the infecting bacilli being either *B. enteritidis*, *B. suipestifer*, or *B. aertrycke*. The actual source of infection of the food is, in the majority of cases, not *intra vitam* from infected animals, but through secondary infection of sound food. In a minority, but still a very considerable proportion, it is due to infection of the living animal with one of these bacilli.

For the latter group of cases we need to arrive at an accurate conception of the nature of the diseases and conditions affecting domestic animals which may render them liable to originate outbreaks of food poisoning. Even yet we cannot answer this question with precision, but we do know a good deal about the conditions, both which do not and which do render the meat or milk a source of acute food-poisoning outbreaks.

Amongst those which do not we must place first, on account of its great administrative importance, tainted and putrefactive food. That such food causes attacks of food poisoning in individuals is usually assumed, but the evidence is most unconvincing, and that it cannot originate widespread outbreaks is practically certain. To produce such outbreaks the food must be specifically infected with a member of the Gaertner group, and these organisms are not a cause of tainted food.

Apart from secondary infection of the food in course of preparation for sale or consumption, the only direct source of infection from an animal used for food is either when it is suffering from some form of disease associated with this group of bacilli or is acting as a carrier of these bacilli.

In only a few of the recorded British outbreaks is there direct evidence of disease in the animals supplying the peccant food. In several cases where milk has been the vehicle the condition has been traced back to infection of the cow with a member of the Gaertner group. The only two instances which I have been able to trace, spread by meat from a diseased animal, are those at Murrow and at Limerick. On the other hand, the continental outbreaks show this association much more frequently.

Animals used for food undoubtedly may be infected with these bacilli, the pathological conditions found being commonly gastro-enteritis, udder disease, puerperal sepsis, and local abscesses. We require a good deal more exact information as to the etiological association of these diseases. I have made a number of examinations, but lack of material has limited my opportunities.

We have also to recognise that animals suffering from Gaertner group infections may recover from such conditions, but the bacilli persist, the animals acting as carriers, and undoubtedly a number of outbreaks have originated from the meat of sound animals being infected (by splashing, etc.) from the intestinal contents of such carrier cases.

I think I may claim that my protracted investigations carried out for the Local Government Board over ten years ago have completely refuted the idea which originated in Germany, and which was widely accepted when those observations were made, that these bacilli are normal intestinal inhabitants. The extensive work carried out since in this country, America and Germany has fully confirmed these investigations.

In connection with the question of the secondary infection of food the importance of rats and mice must not be overlooked, since these animals frequently are infected with Gaertner group bacilli, and such infected animals, or those who have recovered and still harbour the bacilli, may act as a vehicle of infection.

It is therefore possible to have clear ideas as to the extent to which the domestic animals used for food may serve as a cause of food-poisoning outbreaks, and the lines along which we must institute our inquiries when they occur.

DIPHTHERIA AND CATS.

That cats may be attacked with human diphtheria, or act as carriers of the bacilli, and so spread this disease, is a view very widely accepted amongst medical men and in the text books.

Time will not allow me to discuss the experimental and other grounds for this view, and I must refer inquirers to my paper, published last February in the *Journal of Hygiene*, which deals with this and with my experimental work. This view has been kept warm, and received considerable support from the reports published by Medical Officers of Health and others as to the finding of diphtheria bacilli in the throats of cats associated with cases of human disease.

My investigations were along three lines. The examination of the throats of healthy cats and kittens quite unassociated with cases of human disease showed that in the swabs from the latter no organisms like diphtheria bacilli were detectable, but that from no less than five out of eight healthy cats bacilli were found growing on the cultivation media, which, morphologically, very closely resembled diphtheria bacilli, and which could not be distinguished from that organism in the films from the cultures. One cat re-examined three months later still showed these organisms. When they were isolated and their characters studied in pure culture, it was manifest that they were *not* true diphtheria bacilli, nor were those tested pathogenic.

All the cases mentioned above, where diphtheria bacilli were reported as found in the throats of cats associated with human disease, rested upon morphological appearances alone and never upon isolation and identification, and, therefore, are completely valueless in view of the above findings.

My second line of enquiry was the examination of cats actually closely associated with human cases of diphtheria, and here, in several instances, as might be anticipated from my findings in healthy cats, bacilli morphologically indistinguishable from diphtheria bacilli were found in the cultures from the swabs. When isolated and fully investigated, however, none were found to be true diphtheria bacilli.

The third line of investigation involved the experimental inoculation of kittens, to see if it was possible to infect them with diphtheria bacilli by natural channels. As many as 19 different experiments were carried out, and 10 different strains of human diphtheria bacilli were used, the virulence of 4 of them being fully tested.

Massive and repeated feeding with highly virulent cultures (in one case on 11 occasions) were quite without effect. Kittens whose throats were inoculated by swabs with enormous numbers of diphtheria bacilli, either alone or mixed with staphylococci and streptococci, grown direct from human cases of diphtheria, remained unaffected, and the bacilli had disappeared within 24 hours. The possibility that the failure to infect the kittens was due to the absence of a local nidus of growth was met by creating such a nidus by a preliminary scarification of the throat, and with other animals by painting with strong silver nitrate solution. Subsequent massive inoculation with diphtheria bacilli still failed to produce any infection or, what was remarkable, any persistence of the bacilli locally. The same striking fact was brought out by a series of nose-swabbings with heavy doses of diphtheria bacilli. In every instance the bacilli rapidly disappeared, and neither local nor constitutional symptoms resulted. These results were exceptionally uniform and concordant. It was found impossible either to infect the kittens or produce a carrier condition, even one of very short duration.

The whole series of experiments justify the opinion that the common and widely accepted view that cats can suffer from a naturally acquired disease caused by the diphtheria bacillus is entirely without foundation. The reported cases of such an association are based upon insufficient examination and differentiation of the bacilli found, due to a failure to realise that a large proportion of healthy, normal cats contain in their throats bacilli which closely resemble, and are difficult to distinguish from, the true *B. diphtheriæ.*

The above selected examples only illustrate a small part of the possible interrelationship of human and animal infectious diseases.

I am convinced we do not utilise a great deal of available information which would be most helpful to both professions by our failure to secure extended co-operation between the medical and the veterinary professions. We live and work far too much in watertight compartments.

Medical men are liable to draw hasty conclusions as to diseases in animals and their association with human diseases, which may be very incorrect, because they are imperfectly acquainted with the diseases of animals and the bacteriology of healthy animals.

The veterinary profession fail to utilise as much as they might the detailed investigations of medical men upon human diseases, which would often throw light upon animal diseases, while I have the impression that they do not sufficiently consider animal diseases from the point of view of their possible relationship to human diseases.

Certainly, it is undeniable that if both combined together more than they do we should materially improve our knowledge of the relationship between human and animal diseases.—*Journal of the Royal Sanitary Institute, March,* 1921.

Clinical.

SUGGESTIONS FOR THE USING OF THE READING BACILLUS IN THE TREATMENT OF WOUNDS.

BY J. D. WHITEHEAD, F.R.C.V.S., D.V.S.M.
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THE Reading Bacillus may be used with advantage in all conditions of wounds, including Quittors, after operation.

The following points are suggested :—

1. The wound should be laid open to its extreme depth and drainage established; all foreign bodies removed.
2. Wash with saline solution, pack with ordinary salt, and leave undisturbed for two days.
3. At the end of the second day remove all dressings and irrigate well with hypertonic saline solution.
4. Sow the Reading bacillus in cultures freely, using an ordinary hypodermic syringe and taking care to introduce it into every part of the wound.
5. Apply a thin layer of sterile cotton wool over the surface of the wound, packing it in tightly, to absorb the culture lying in the wound. Use more of the culture to thoroughly soak the cotton wool.

6. Insert salt packs, moistened with water, and pack in very tightly. These will soon assume the shape of the wound.
7. Lay some cotton wool over the packs and squeeze the whole in tightly.
8. Sutures, bandages, etc., may be applied to keep the packings *in situ.*
9. Leave undisturbed for five or six days. If the top layer of cotton wool becomes displaced, renew it, and no harm will be done.
10. On the fifth or sixth day remove all the dressings and packings and irrigate thoroughly with saline solution. All dead tissue will come away during the irrigation, or can easily be removed with forceps.
11. It is suggested that subsequent treatment be as simple as possible.

Keep cultures in cool, dark place until required for use.

EXPERIMENTS IN THE READING BACILLUS TREATMENT OF WOUNDS.

Experiments in the treatment of wounds in horses and mules by means of the "Reading Bacillus" may be classified into two series:—

1ST SERIES.

These consisted of six cases, but owing to faulty methods of packing, practically no information could be gathered as to the value of the treatment.

The method of packing adopted was to sow the organism as instructed in the circular letter, and to pack the cavity of the wound with salt packs.

These packs were made by wrapping salt in sterilised gauze, and suturing the wound with ordinary tape sutures.

The results, however, were unsatisfactory, because it was found that in the course of a few days (two or three) the pack became loose owing to the shrinking of the salt packs, due to the melting of the salt. Furthermore, the sutures slackened owing to necrosis of the skin—due to the tension on the skin.

Thus the whole of the packing tended to "sag" or drop down, and anærobic conditions favourable to the growth of the organism were not obtained.

Case 1.—No. B3A/9045, L.D. Grey Gelding. This animal had a wound 12 inches by 4 inches on the near side of the neck, with no tendency to heal. The cavity was packed on 10/7/18, but the packing came away the following day, therefore quite unsuccessful.

Case 2.—No. B3A/1838, R. Bay Gelding. Large abscess cavities were on both sides of the neck, 9 inches long on the off side, and on the near side there were two openings, each 6 inches long. They were inoculated with "Reading Bacillus" and packed with salt packs on 10/7/18. They were unpacked on the 15/7/18. Necrotic tissue came away. On 22/7/18 it was observed that from the top wound on the off side there was no discharge. From the bottom wound there was a slight creamy froth, and from the near wound there was a slight creamy froth due to continuous movement. This case was a most indefinite one, and did not progress. On the 21/9/18 the animal was destroyed for meat.

Case 3.—No. B3A/1814, L.D. Bay Gelding. This animal had a vertical wound on the off side, behind the scapula, 1 ft. in length, and also a large abscess cavity in off axilla. On the 10/7/18 the cavity was packed, and on the 14/8/18 the vertical wound was unpacked. On the 15/8/18 the axilla abscess cavity was also unpacked. On the 22/8/18 it was noticed that there was no discharge from the scapula wound, but from the axilla wound there was a slight creamy pus. The necrotic tissue was coming out gradually, whilst the remainder of the wound was healthy. Unfortunately the original operation on this case was not successful, as at a later date shrapnél was discovered at the upper end of the vertical wound and posterior to it. The wounds treated did well, but issue was delayed by the failure to locate shrapnel at original operation. The animal was issued on the 24/9/18.

Case 4.—No. B3A/839, Mule, Brown Gelding. Six years. Two wounds on the withers from sinuses laid open. Packed on the 10/7/18. The packing broke away on the 14/7/18. These wounds did well, but a further sinus developed later and the animal was slaughtered for P.O.W. on the 7/10/18. Post-mortem examination showed disease of the cartilage of prolongation of the scapula.

Case 5.—No. B3A/3119, L.D. Bay Gelding. Fistula withers. This animal had an opening 12 inches long on the near side. On the 21/7/18 the cavity was packed, but on the 23/7/18 the packing came away. On the 25th the wound was irrigated with saline solution. In the lower part of the wound healthy granulations were to be observed. The animal is still under treatment owing to development of fistula on the off side.

Case 6.—No. B3A/1801, H.D. Black Mare. Tumour near shoulder. This animal had an opening 15 inches along the course of the jugular near the collar seat. On the 17/7/18 the cavity was packed with salt packs. On the 22/7/18 there was a slimy discharge, and on the 23/7/18 the cavity was irrigated with saline solution. The wound was healthy, although pieces of yellow gelatinous material were on the wound. Owing to the position of the tumour it was not possible to remove all the fibrous tissue at the operation, and the wound was one which would have taken a long time to heal by the ordinary method. From the date of unpacking there was never any pus. The wound healed up in a surprising manner, considering its extent and its appearance at the termination of the operation. On the 24/8/18 the animal tore open the wound on a manger, but otherwise practically healed. On the 23/9/18 the animal was issued to remounts.

Case 7.—No. B3A/1813, L.D. Grey Gelding. This animal had a gunshot wound on the off shoulder behind the scapula. There was a frothy, stinking discharge, and very unhealthy granulations. There was also a great amount of movement of the injured muscles in this region. On the 20/7/19 the cavity was inoculated with "Reading Bacillus" and packed with salt packs. On the 23/7/18 the packing came away, and by the 25/7/18, after the cavity had been irrigated with saline solution, healthy granulations were present. On the 30/8/18 the wound was quite healed, and the animal was issued on the 26/9/18 to remounts.

2ND SERIES.

In these cases a different method of packing was adopted. After sowing the organism the cavity of the wound was packed with salt packs made in the following manner:—Thin layers of cotton wool were soaked in a saturated solution of salt. Then about a tablespoonful of salt was rolled up in these thin layers, and they were squeezed as tightly as possible so as to dry them. The wound was then tightly packed with these layers and a roll of dry cotton wool was placed over the opening.

The method of suturing adopted was a form of "quill suturing." Pieces of green willow or cane (cut to length of the wound) and ordinary waxed thread from the saddler's shop were employed. A double length of this material was used, and tied round the willow stick at one side of the wound. It was then pulled tightly to keep the packing in position and tied across the willow on the other side of the wound. This method has been found quite satisfactory and keeps the packing in position. It also has the additional advantage that it does not cause sloughing of the skin, nor does it cause inversion of the skin at the edges of the wound.

After packing an ordinary bandage was applied over the whole in the form of a figure eight, to keep it in position and to add to the cleanly appearance of the dressing.

Cases in Rotation.—The cases enumerated here have done well with one exception (B3A/1360). From the date of unpacking these cases have steadily progressed. There has been no discharge of true pus, such as is described in all text books as "Laudable Pus," and the granulation tissue was firm and healthy. A wound after unpacking presents in a couple of days the appearance throughout its entire surface of healthy granulation tissue.

The " Reading Bacillus " has, I consider, undoubtedly the power of removing dead tissue rapidly, and because of this nothing is left on which ordinary pus-forming organisms can grow (for further reference on this particular point see " Import of Dead Tissue in Wounds," in the *Veterinary Record* of September, 1917).

It must be also noticed that the wounds on which these experiments were conducted were on the body, and were not progressing satisfactorily under ordinary treatment.

The methods described with regard to the use of the " Reading Bacillus " in the letter from No. 2 Veterinary Hospital were not followed implicitly. Wounds were not packed with salt packs immediately after operation for the following reason :—Because it was considered that a suturing of the skin on two occasions was likely to cause its destruction and delay healing.

It is, of course, hardly possible to say how much time is saved by this method of treatment, but at the present moment an animal with shrapnel wounds in both hind quarters is being treated by ordinary methods, and a comparison can be made at a later date.

Near quarter similar to B3A/1796.
Off quarter similar to B3A/1803.

The cases which have proved the most remarkable amongst those treated are B3A/1801 (of 1st Series) and B3A/697 (of 2nd Series).

Case 1.—No. B3A /1803, L.D. Bay Gelding. This animal was admitted to hospital with a gunshot wound off quarter. This wound cavity was 8 inches deep and 8 inches long. On the 24/8/18 shrapnel was removed from the wound, and on the same day salt packings were introduced. On the 27/8/18 the packs were removed. There was remaining a large quantity of necrotic green tissue in a bad state. On the 27/8/18 the wound was packed with one tube of " Reading Bacillus." On the 2/9/18 it was unpacked, and the wound contained bright and healthy granulations. On the 6/9/18 there was a very small, slimy, serous discharge. On the 24/10/18 the animal was issued to remounts.

Case 2.—No. B3A/3044, L.D. Bay Mare. Wound punctured, bomb, near hip. On the 27/8/18 this animal was admitted to this Ward, having been treated previously by ordinary methods. The wound had not shown any tendency to heal. On the 2/9/18 the wound was opened out and drainage obtained. The fibrous tissue lining was removed. On 5/9/18 it was packed with " Reading Bacillus," and on 10/9/18 it was unpacked and irrigated with saline solution. The animal is still in hospital, and is preparing for issue.

Case 3.—No. B3A/3498. R. Brown Gelding. Gunshot wound near quarter. This wound cavity was fully 9 inches long and 8 inches deep, and there was quite a quantity of necrotic green tissue. On 2/9/18 the wound was opened out, and packed with "Reading Bacillus" on 5/9/18. It was unpacked on 10/9/18 and irrigated with saline solution. The wound contained bright and healthy granulations, and healing has progressed very rapidly. The animal is still in hospital and doing extremely well.

Case 4.—No. B3A/1796, Rider Black Mare. Shell wound. From this wound there was a dirty chocolate discharge, which has an unhealthy and foul smell. The wound was 1 ft. in depth and 8 inches long. On 27/8/18 it was packed with "Reading Bacillus," two tubes. On 2/9/18 it was unpacked and the cavity was irrigated with a saline solution. The wound was very healthy in appearance, and no fibrous tissue was to be seen or felt. This case is now fit for issue to remounts and has progressed most favourably at a rapid rate.

Case 5.—No. B3A/697. Light Draught Bay Gelding. Wound off side sacrum. This wound was the size of a cocoanut, and the cavity penetrated downwards towards rectum. Drainage was impossible. It might also be added that this wound had been treated by ordinary methods prior to admittance to the Ward. On 7/9/18 the cavity was packed with two tubes of "Reading Bacillus." On the 10/9/18 it was unpacked and irrigated with a saline solution. The wound presented a very healthy appearance, and from the date of unpacking progressed steadily and rapidly. The animal is now preparing for issue.

Case 6.—No. B3A/8488, Bay Gelding H.D. This animal had a wound off quarter. This case was a very bad one, as a counter opening had to be made to the original pus-discharging opening in order to remove loose bone causing the discharge. A great amount of muscle was thus injured. On 10/9/18 the cavity was packed with "Reading Bacillus," and on 15/9/18 it was unpacked and irrigated with a saline solution. There was no pus discharge of any kind, and the wound was doing exceptionally well when the animal developed strangles and was transferred into another ward of the hospital.

SUMMARY.

"Reading Bacillus" undoubtedly has the power of causing the rapid sloughing of dead tissue.

On unpacking a wound this tissue comes away in large grey, dirty pieces (not unlike dirty lint), and in all cases where there were no pockets left for lodgement of pus there has never been any discharge of pus afterwards.

It must be borne in mind that the cases recorded above were practically all unsatisfactory cases prior to this treatment, thus testing its value severely.

As to the amount of time in hospital saved, this cannot, of course, be stated in days. It appears fairly obvious, however, that if after say seven days there is no further destruction of tissue in a wound, but only a steady progressive healing process taking place, such a case must necessarily be ready for issue much earlier than one where the wound is discharging pus for months. In addition there is no danger of pus burrowing and forming pockets beneath the skin or elsewhere, which, unfortunately, does happen even in wounds apparently well drained. It is my desire to continue with this treatment, and to employ it in cases which present greater chances of recovery than those enumerated above.

SOME NOTES ON LIVER-FLUKE DISEASE AS OBSERVED IN NORTHERN RHODESIA.

By H. E. HORNBY, M.R.C.V.S.

Northern Rhodesia and the adjoining countries experience a rainy season from November to April. The remaining six months are dry. During the season of drought the rivers dry up until at its end only the largest are flowing, and, away from them, men and animals obtain their water from isolated pools and springs.

Liver-fluke disease occurs throughout the whole country, and with increase in the cattle population its ravages become more evident. Long since, because of this disease and of the strongyloses common to both cattle and sheep, the latter animals have ceased to flourish in most stock-raising districts, and to-day the mortality among cattle from distomiasis is severe.

The causal agent is *Fasciola gigantea** (Cobbold), which differs from the common European fluke by its greater length, more elongated shape, and the closer proximity of the two suckers. The common intermediate host is a snail, which, somewhat arbitrarily, has been named *Limnœa natalensis*, but other water-snails may serve. Before I knew of the recent important researches in South Africa carried on independently by F. G. Cawston and A. Porter, I had determined that the water-snails in pools on heavily infected ranches harboured many cercariae, but before I had proved that these were larval forms of fasciola I came across the work referred to, and I was able to identify the snail parasites as *Cercaria pigmentosa* (Cawston), which Porter has proved to be the larva of F. gigantea.

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* Spelt "*F. gigantica*" by some authors.

In December, 1919, I placed ten adult specimens of *Limnæa natalensis* in as many test tubes containing clean water, and within a few hours three of these were surrounded by many cercariæ just visible to the naked eye. Under the microscope the presence of two suckers, a bifurcated intestine and a number of granules can be demonstrated easily. Although they lash their tails freely, movement is effected by lengthening and contracting the body (euglenoid movement). After about 24 hours of free-swimming life each cercaria casts its tail and encysts. In nature, before doing this, the parasites are said to leave the water by creeping up the stems of plants; in a test tube most of them encyst on the glass well below the surface of the water. Such cysts are very tenacious of life.

Another common water-snail in South and South-Central Africa is *Physopsis africana*, and on one occasion I found a specimen of this species heavily infected with *Cercaria pigmentosa.*

It is extraordinary how a snail can harbour hundreds of cercariæ and rediæ and yet appear to be in normal health.

Water-snails can be found in large numbers throughout the whole of the rainy season. During the dry months, especially June, July and August, when the weather is cold, they are not found so readily. Last year during those winter months I travelled some hundreds of miles by canoe, and casual observation failed to reveal any water-snails at all; presumably during the cold weather they lie at the bottom of the water. Nevertheless, I have found them during all months of the year, but the rule is as stated.

The environment most favourable to the development of water-snails is clear water without much flow, an abundance of water-plants and a firm gravel or clay pool-bottom. They have difficulty in surviving in swiftly flowing water, in pools the surface of which is covered by scum, in water overlying soft mud, and in the acid water of "sour oleis." Thus they flourish best in exactly that kind of water which forms the apparently ideal drinking-place for cattle, the backwaters of the great rivers, and the shady, grass-fringed pools of the "sweet oleis." In such places, during the warm months, snails can be found in abundance, clinging to water-plants, or walking on the under-surface of the water, feeding on protistæ as they proceed. Physa, at any rate, appears to be unisexual, because pairs of this snail are frequently seen floating together. Eggs are laid in packets of about 25 (Physa). I don't know how long they take to incubate, but presumably only a few days under the most favourable conditions. Growth of young snails is rapid, and full size appears to be often reached within a month of hatching. Neither snails nor eggs appear to be resistant to desiccation, and I believe that any pool which becomes thoroughly dry, so that no mud at all is left, has to be restocked afresh each year. This restocking is effected by the floods, which link up all the pools in a valley or on a plain. At any rate, a month after the commencement of the heavy rains, pools which before then were quite dry and their exposed bottoms covered with empty snail-shells, now contain numerous water-snails, in all stages of development. Water-snails appear to be of about the same density as water ; sometimes a little less, when they float ; sometimes a little more, in which case they sink if detached from water plants. Occasionally a floating snail may be observed to liberate a bubble of gas which so alters its specific gravity that it immediately sinks.

These scattered observations of snails were made with a view to determining how liver-fluke disease could be combated.

Some ranches depend for their water during the dry season on pools, or on small rapid streams which spring out of the hills to run a few miles and then disappear. On such places liver-fluke disease can be controlled. One should avoid the low-lying pastures during the rainy season, using them only after the floods have gone. The best drinking place for cattle is furnished by a swiftly-flowing small stream which has sandy banks devoid of vegetation. The worst is a still, clear, reed-surrounded pool with a firm bottom, where cattle are tempted to linger and pluck at the grass which grows so luxuriantly on the banks of and within the pool itself. Better than such a sylvan spot is the foul mere, the banks and the very water of which have been churned into plantless mud by thirsty cattle and on the soft bed of which no snail could support existence. At the very end of the dry season, too, on a farm or ranch with a limited water supply, a determined effort can be made to reduce the snail population by digging over and burning the surface of all dried pools and by clearing the existing ones of as much herbage as possible.

Unfortunately the best ranches of Northern Rhodesia lie along the banks of the great swampy rivers, the plains on each side of which are deep under water during the rains, but gradually dry up later, furnishing, as the water recedes, abundance of excellent grass during the whole season of drought. The great value of these ranches lies in the quality of this excellent winter food, and I do not know of any way of ridding them of water-snails. There are hundreds of thousands of acres of magnificent grazing along the banks of the great rivers which are spoilt by the presence of flukes.

The effect of flukes on cattle is most marked in cows and yearlings; in fact the presence of the disease is indicated by a general unthriftiness of the cows and yearlings of a herd at a time when the oxen and heifers are in good condition. A fluke-infested cow falls away to a shadow after parturition, producing milk for her calf at the expense of her own tissues. Young stock vary much in the extent to which they show signs of infection, but an affected herd shows too large a proportion of "weeds," and its general condition is unsatisfactory. Adult oxen are marvellous in the way they can retain their condition when their livers are full of flukes, but even their resistance has a limit.

Most of the symptoms of fluke-disease in cattle are those of malnutrition. When the liver's functions are deranged, fats are ill-digested, proteins are not deaminated, glycogen is not stored up, and so an affected animal can only keep in good condition by ingesting an excess of nutrient material. In addition, in very advanced cases, one recognises symptoms of anæmia due to the blood-sucking habits of the parasites and to the hæmoclastic properties of toxins normally intercepted by the liver. Jaundice, dropsy and diarrhœa may also be observed. Very many animals die from the disease.

It is now generally recognised that flukes reach the liver via the peritoneal cavity, and that, very rarely, the passage of numerous young flukes at the same time may cause acute peritonitis and hepatitis. While such a condition may be met with in sheep, it is very rare in cattle, no doubt on account of the greater size of the bovine organs; in fact, the greater severity of both distomiasis and strongylosis in sheep can be accounted for an anatomical grounds.

Diagnosis of the disease among a herd is made easy by post-mortem examination of any member. It is unnecessary to try and develop a complement test. Microscopical examination of fæces for eggs will reveal very few, even when a beast is heavily infested, it being remembered that the fluke population of a liver is very small compared with the strongyle population of a heavily infested abomasum, and that the larger eggs are correspondingly more difficult to find in a great mass of dung.

Medicinal treatment of infested herds does not hold out much promise of success. Male-fern is too expensive, and in my hands kamala has not yet given good results. The method of using the latter drug has been to give an ounce on the back of the tongue on two successive evenings. I have not been able myself to watch the effects of this dosing on the parasites and their unfortunate hosts, but my late stock-officer entrusted to watch results has written to say that no benefit has been observed, but that he will give the drug a further trial

A CASE OF MILK FEVER.

BY A COUNTRY PRACTITIONER.

IN the forenoon of February 2 last I was called to see a cow which had gone down after calving. Being away from home I did not get to see her until about 7 p.m., when I found her bright and cheerful, eating well and chewing her cud, but unable to rise. The pulse, temperature and breathing were normal. The bowels natural, and she passed urine whilst I was there, without the aid of the catheter. The udder was red and active, and the teats lively and full of milk. Milk secretion very little, if any, suspended. Her skin was cold.

I diagnosed it as an ordinary case of "Dropping after Calving," gave a dose of Tr. Aconite, and left a cleansing drink, rubbing her back with liniment and rugging her up.

I saw her again the following afternoon about 4 o'clock, and found her still bright, eating and chewing the cud, and milk coming as usual. About 7 o'clock the same night I got a message saying that the cow was violent, throwing herself about and apparently in great pain. Not being convenient to see her that night, I sent a draught containing:

Chloral hydrate.
Pot. brom. āā 6 drs.
Aqua ad 6 ozs.

To be given in 1 pint water.

On my visit next morning I found her deeply comatose, the udder empty, teats white and shrivelled, and secretion of milk gone. The eyeballs fiery red and injected. Prognosis unfavourable. I now pumped air into the udder and tied the teats, ordering it to be left in for eight hours.

On my visit the following day I found her slightly better, but still partly comatose, and a little milk in the udder. I now gave her powders of ammon. carb. and foenugrek.

The next day she was decidedly better. Coma had passed away, milk coming more freely, appetite increasing, but not chewing the cud. A mixture of nux vomica and ammon. aromat was left.

The next day she was up and doing well, and made an uneventful recovery, except that most of the skin peeled off one side of the ribs and partly off one leg.

During my experience of milk fever I have never had a case in which coma has been delayed so long. I have had one or two in which it has come on a few hours (about eight) after dropping. This case would be about thirty hours after dropping before any symptom of milk fever came on. Thinking that this was unusual is my reason for sending it to the JOURNAL.

TWO INTERESTING CASES OF FOREIGN BODIES IN CANINE PRACTICE.

By H. C. P. KING, M.R.C.V.S.,
Kennington Cross, London, S.E.

Case 1.—White Pomeranian, male, four months old. This animal was in considerable pain, and screamed when the abdomen was pressed upon. There were frequent attempts at vomition, and the dog preferred to lie with its head and neck extended and resting on a cushion. Temperature normal. This condition had been in existence two days prior to my seeing it, and the owner had given it some castor oil, without any improvement.

Diagnosis.—Probably a foreign body. Digital examination per rectum revealed nothing actually in the rectum itself, but through its wall and on the left hand side could be felt a hard blunt point resembling a piece of wood.

Treatment.—Decided to perform an exploratory laparotomy. Administered ¾ gr. morphine hypodermically completing the anaesthesia by means of chloroform. An incision was made directly to the left of the median line in front of the penis. On exploring the abdomen with the fingers a foreign body could be felt in the bowel, which, on being brought as near as possible to the primary incision, was opened by making an incision about ¼ inch long. Through this opening was withdrawn a lady's hatpin seven inches long, and minus the knob. Three silk sutures were inserted in the bowel and the wound was painted with Tr. Iodi 2½%. The abdominal wall was sutured in two layers, the wound dressed with Tr. Iodi, and sealed with collodion, and a pad of cotton wool was kept in position by a bandage. About the third day there was a little suppuration from the front end of the wound, probably owing to contamination by urine. This necessitated removal of two or three of the outer sutures. After-treatment simply consisted in the application of Eusol and dry dressing. The dog was fed only on milk and Brand's essence of beef in very small quantities. The wound healed perfectly, and the animal was discharged from hospital in fourteen days.

Case 2.—Pomeranian, male, about eight weeks old. This dog stood with its back arched and evinced considerable pain on being lifted up. The abdomen was tense and distended. The dog refused solid food in the form of bread and milk, but could swallow milk alone fairly well. It would be quite quiet for a few minutes, and then suddenly emit a painful yelp.

Diagnosis.—The presence of some foreign body was suspected. The mouth, pharyngeal and cervical regions and the rectum were examined, but nothing abnormal found. X-ray examination revealed a foreign body in the thoracic portion of the oesophagus.

Treatment.—The probang was gently passed, but failed to dislodge the obstruction. Petroleum emulsion and chlorodyne were given three times daily to allay the pain and in the hope that after repeated lubrication, of the oesophagus, the foreign body might descend into the stomach. The animal took milk quite readily. After three days and no improvement, we tried the dog with bread and milk, which, as expected, he readily devoured, though swallowing was difficult. So we finally decided to let him have as much as he would take and then administer an emetic in the hope that its sudden expulsion might by chance dislodge the obstruction. This, as luck would have it, it actually did. There was just a suspicion of blood on the piece of bone which was the cause of the trouble.. As the dog was now quite lively, and was taking milk and Brand's essence readily, it was returned home two days later. Unfortunately, its owner, in spite of our instructions to the contrary, allowed it to partake of a considerable amount of meat in big pieces, and the animal died suddenly the next day. Post-mortem revealed the stomach full of congealed blood, pieces of meat, and the remains of a match-box with which the dog had been playing. The oesophagus was ruptured, but the thoracic cavity was free from blood.

POISONING OF SHEEP BY SODA.

By H. A. REID, F.R.C.V.S.,
Veterinary Laboratory, Department of Agriculture, New Zealand.

I HAVE recently had brought to my notice a heavy mortality occurring among a mob of sheep, the cause of which has been determined by analysis to be the result of absorption of sodium salts.

The history of the cases is as follows :—

A line of sheep purchased for slaughter by one of the meat export companies left the homestead in perfect health and condition, and were travelled by road to be entrained at the nearest railway station—a distance of about thirty miles.

The journey by road occupied three days, and was undertaken during exceptionally hot, dry weather. The sheep were duly trucked, and appeared at the time none the worse for having been driven under these conditions.

The journey by rail to their ultimate destination occupied four days. Soon after their arrival at the works some of the sheep commenced to die. They were removed from the works and depastured not far away. The mortality continued, until, out of the original mob of 775 sheep, 150 had died.

The only symptoms noticed were a staggering gait and hurried respirations. Subjects showing these symptoms lay down and shortly afterwards expired.

Two full-mouthed Lincoln wethers were brought to me in a motor lorry for examination. Both animals were dead, though one had been loaded while alive and had died *en route* within an hour of starting. Post-mortem examination disclosed congestion of the subcutaneous veins, the blood having clotted imperfectly.

On opening the abdominal cavity the small intestines were seen to be congested and studded on their serous surface with hæmorrhagic patches (*ecchymoses*).

The gall bladder of one of the sheep was greatly distended with dark green bile. Some occlusion of the bile ducts seemed to have occurred, for the surrounding liver tissue was deeply bile stained, and the bile ducts were distended to the thickness of a pencil. Bile staining was also present in the omental fat. The liver appeared to be slightly congested, but firm in texture. The abomasum presented a striking appearance, much more marked in one of the sheep than the other.

In the more acute case the abomasum was filled with dark, blood-stained fluid contents. The mucous lining was intensely congested and hæmorrhagic over almost the entire surface, reminding one of the appearance commonly seen in cases of cattle plague. In the other cases the congestion was well marked, though not so diffused.

Lesions in the bowels coincided with those seen in the fourth stomach, the degree of congestion diminishing gradually as the bowel was traced back from the duodenum.

The kidneys appeared to be slightly congested. The spleen was normal in size and consistence.

The heart and lungs showed no abnormality beyond hypostatic congestion of the latter, and venous engorgement, which one would expect to find in a dead animal.

A moderate proportion of nematode worms were present in the abomasum. The blood appeared to be sterile on microscopic examination and otherwise normal.

Sections of the liver and kidneys examined microscopically showed no notable changes beyond slight venous congestion of the former.

The intense gastro-enteritis led me to conclude that some form of irritant poison was accountable for the post-mortem appearances described. I accordingly forwarded the stomach contents, and also the liver, kidneys and spleen to the Government analytical chemist for further investigation.

In due course the analyst reported that no poison could be isolated from the latter organs, but that the contents of the stomach gave a strongly alkaline reaction, with effervescence on the addition of acid. On evaporating some of the fluid contents of the fourth stomach to dryness numerous crystals of sodium carbonate were recovered. The ingestion of this substance had undoubtedly provoked the mortality.

The question as to whence the poison was derived is interesting and open to speculation. In view of former similar experience with pigs one is led to assume that the sheep may have had access to the effluent from one or other of the dairy factories along the road on the way to the railway station. These factories employ quantities of soda solution for cleaning purposes. Sometimes proprietary "cleansers" are used, of which the basis is commonly sodium carbonate or sodium hydrate. Sodium salts are also used to neutralise the lactic acid of the milk or cream, as the case may be.

The effluent of the "washings down" is, in some cases, allowed to flow into channels contiguous to the roadway. As it is impossible to discover any other source, it seems reasonable to suppose that the sheep, parched with thirst through being driven on the hot, dusty road, partook of water containing the soda solution in this way. The varying degrees of inflammation present in individual sheep may be accounted for by the act of drinking having been accomplished hastily in some cases and with more leisure in others.

The length of time, five to six days, between the probable intake of the poison and death is in accordance with a commonly observed fact regarding poisoning by alkalies. In the human subject, according to Taylor,* three hours is the most rapidly fatal case recorded, while others take from six weeks to two months before fatal results ensue.

The effects of the soda seem to be confined to the upper portions of the alimentary tract, acting as a topical irritant to the mucous surfaces of the abomasum and small intestines, while the organs of neutralisation and excretion, such as the liver and kidneys, appear to have received little or no damage.

The symptoms noted—staggering gait and hurried respirations—in the more rapidly fatal cases may depend, to some extent, upon the absorption of toxins through the damaged mucous surfaces, while in more prolonged cases death from cachexia, through malnutrition following the chronic inflammatory process, may determine the final issue.

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* Taylor on Poisons.

THE RESULT OF A WORM DOSE.

By WALTER GREY, M.R.C.V.S.,
Ilford.

VERMIFUGES of the present day are much more satisfactory, both in the manner in which they are dispensed and the certainty of their action, than they used to be, but it is by no means on every occasion that one gets a result such as the under-mentioned. The patient was a whippet, two years old, to which, on April 15, 1920, after the usual 24 hours' fasting, I had administered 30 minims of Taenaline, Seventeen minutes later the animal passed a huge bunch of tapeworms, from which I teased out and counted no less than 69 complete parasites, all Taenia Marginata. I think that this almost marks a record.

Translations.

RINDERPEST IN BELGIUM.

RINDERPEST, which has not appeared in West Europe since 1870, was reported in Belgium at the beginning of August. Zebus imported from British India and Rio de Janiero, which were landed at Antwerp, introduced the disease ; cattle from North America sent to Belgium to aid in restocking the country became infected and spread the disease ; 384 animals died of the disease and 326 were destroyed. On August 6 there were forty centres of infection. Strict sanitary measures were at once adopted by the Belgian Government, serum was obtainep from Egypt, and plans instituted for a home production of the matter at Brussels. On August 15 a total of 58 communes and 130 holdings were affected, with 1,068 bovines dead or killed. Great precautions was taken on the French frontiers to prevent admission of the disease into the country. These were so successful that only one case, near Lille, was discovered.

In October only four centres of infection existed in Belgium, and inoculation work proved very successful. Many countries, including the Netherlands, Denmark, Italy, Spain and Servia, sent representatives to study the preventive operations.

On October 18 the severe measures in France were abated. Circulation of animals was permitted in the frontier communes, as well as the traffic in solipeds in the neighbouring Belgian communes. Animals for slaughter were permitted to travel to the public abattoirs of the frontier districts.

In the frontier districts, and in that of Bethune, measures are limited to the confinement of all ruminants. The forbidding of hunting, which raised violent protests, is lifted, except in the frontier communes.

It is henceforth more than probable that the plague will be limited to Belgium and that France will be preserved. In any case, the provision of serum provided will limit the losses and prevent extension of the first centres.

The Belgian sanitary services from the first have shown an optimism which events have justified.

The sanitary system applied has consisted in vigorous isolation of contaminated holdings, with slaughter of the whole of the ailing and in-contact animals; burying with superficial disinfection of the ailing and infected ones showing hyperthermia; sending to the refrigerator and for use as food contaminated animals without a temperature; complete disinfection of the locale.

Observations gathered show that, on the one hand, the spread of new centres of disease has been brought about in almost all cases by accidentally or fraudlently infected animals; in a few cases only by the transport of fresh meat.

On the other hand, one finds no mention of very indirect processes of spread named in all the classics. Intermediary life, man, refractory animals play only an insignificant or nil role. Precise observations show that flies do not carry the virus.

To what ought the relative mildness of the plague in Belgium to be attributed? A first hypothesis comes to mind. The virus introduced, issue of the zebu, an animal normally very resistant, was attenuated and little active. This idea appears controverted by two reasons. In the first place successive accidental passages in contaminated animals have not brought about aggravation in the epidemic type. On the contrary the march of the plague has uniformly relaxed. Secondly, it was found that experimental inoculations of virus obtained from the first sick animals caused rapidly fatal results with the minima of classical delays.

It seems to us that rinderpest is not to be feared as it has been.

One can understand the rapid spread of the plague in countries submitted to enemy invasion, where the disease is spread by animals not under control. One can also explain the invading advance of the plague in countries where sanitary rules are difficult of application or impossible. The permanence of the plague in the East, in Egypt, and in India, the epizootics of the continent of Africa are easily explained.

On the contrary, rinderpest is effectively combated in nations possessing a sufficient sanitary organisation. The epizootic of 1865 was stamped out without too much difficulty in the North of France by well planned intervention carried out by improvised means. Its extension into England may perhaps be traced to absence of any co-ordinating sanitary service.

The data gathered in 1920 are reassuring. They show the excellence of classic methods in a country possessing a veterinary organisation. It is certain that the terror that contagious typhus of bovines, the dreaded plague, inspires is a powerful factor of success against it. Thanks to it severe repressive measures can be carried out without protestations and applied without too much resistance. The fear of contagion is such that one obtains the collaboration of all interested, which constitutes the necessary condition of all effective intervention. —*Revue Général de Médécine Vetérinaire.*

G. M.

SALICYLATE OF SODA HYPODERMICALLY IN THE TREATMENT OF INFECTIOUS ARTICULAR RHEUMATISM OF THE PIG.

By H. STALDER, V.S.,
(*Cossonay*).

M. LHOSTE has described in *La Presse Medicale* his treatment of rheumatism in the horse and cow by subcutaneous injections of salicylate of soda. The article encouraged me to try this treatment in infectious articular rheumatism of the pig. The results were astonishing, corroborating the reputation of salicylate of soda as a specific.

CASE I.—A pig, 3 months' old, suddenly affected with acute articular rheumatism, so that it was impossible for him to keep up. Appetite almost nil. Kept alive by taking a little liquid nourishment. Remained constantly recumbent. The least movement caused him to cry out with pain. The two hocks were enlarged, hot and painful to the touch.

Treatment.—Friction of the limbs with essence of turpentine and subcutaneous injection in the abdominal region of 15 grains of salicylate of soda in 5½ drachms of water. 48 hours afterwards the pig got up; a second injection made it quite brisk and active.

CASE II.—In a litter of pigs 4 months old three suddenly showed difficulty in walking; the most seriously affected one died. Autopsy confirmed the diagnosis of acute articular rheumatism; abundant synovia in the left hock and fibrinous lumps, large quantity of serocity in the pericardium, with fibrinous deposits; no other anatomical lesions. All received a subcutaneous injection of 15 grains of salicylate of soda in 5½ drachms of water; the worst affected one was put in a box by itself and received an injection of 30 grains of salicylate of soda in 11 drachms of water. The limbs were rubbed with essence of turpentine. 24 hours after the least ill one ran into the field to his companions and the one that couldn't get on his feet came to the trough. A second injection cured him completely.

These results induce me to ask my confrères to repeat these trials on a larger scale.—*Swiss Veterinary Journal.*

G. M.

Abstracts.

SENECIO DISEASE.

WITH reference to the article on this subject in *The Lancet* of October 23 Professor Wyndham Dunstan, Director of the Imperial Institute, South Kensington, informs us that a full investigation of *Senecio latifolius* from South Africa was conducted some years ago at the Institute, when "Molteno" disease of cattle and horses was shown to be the result of poisoning by this plant. Professor Dunstan writes as follows:—

In the interesting article on Senecio Disease, by Dr. F. C. Willmot and Mr. G. W. Robertson, of South Africa, which appeared in your issue for October 23, reference is made to similar diseases in stock, occurring in several countries and caused by species of Senecio. In South Africa it was suspected that *S. latifolius* and *S. Burchellii* were the cause of a disease affecting cattle and horses, known there as Molteno disease, and in 1907 a supply of the former plant was forwarded to the Imperial Institute in order that this point might be investigated. A summary of the results obtained was published in the *Bulletin of the Imperial Institute* (1911, ix, 346).

A detailed chemical investigation of *S. latifolius* was made in the laboratories of the Imperial Institute by Dr. H. E. Watt, and the results were published in the *Transactions of the Chemical Society* (1909, xcv, 466). Specimens of the whole plant collected before flowering contained 1.20 per cent. of alkaloids, whilst specimens collected after flowering contained only 0.49 per cent. The total alkaloids were separated into their components, which proved to be two new alkaloids, and were named senecifoline and senecifolidine respectively. Both alkaloids crystallise well and yield crystalline salts. Pharmacological trials with senecifoline nitrate and senecifolidine nitrate were undertaken for the Imperial Institute by Dr. A. R. Cushny, F.R.S., of University College, London, who published a summary of his results in the *Proceedings of the Royal Society* (1911, B, lxxxiv, 188), and in the *Journal of Pharmacology and Experimental Therapeutics* (1911, ii, 531). Dr. Cushny, as a result of his experiments, concluded that the symptoms and post-mortem findings in animals poisoned by the two alkaloids resemble so closely those induced in cattle and horses by *S. latifolius* in South Africa, that there can be no question that the Molteno disease is the result of poisoning by senecio alkaloids.

Senecio ilicifolius and *S. Burchellii*, which, owing to their presence in wheat crops, are believed to have caused the outbreak of senecio disease recorded by Willmot and Robertson, do not appear to have been examined chemically, but it seems highly probable that they contain alkaloids similar to, if not identical with, those of *S. latifolius*.

As stated by Willmot and Robertson, preventive measures against the disease, both in human beings and in stock, are essential. These will include the extermination of the suspected plants and the more thorough cleaning of the wheat. In Nova Scotia, where a similar disease, caused by *Senecio Jacobœa*, the common ragwort, has sometimes caused serious harm to stock, much attention has been given to the former point, and in 1911 an account of measures which have proved successful in Canada in eradicating ragwort was furnished to the South African authorities.

Professor Dunstan states that these measures consist, briefly, of adopting a shorter rotation of crops, more thorough cultivation, the use of weed-destroying implements, cutting the plant before the seed is formed, and, as sheep do not seem to be liable to the disease, grazing these animals on land infested with the plant.—*The Lancet.*

SUGAR USED IN TREATMENT OF EVERTED UTERUS.

Everyone has heard of sugar cured hams, but after reading Dr. G. W. Rader's article in the October issue, I have concluded that there are some who do not know of sugar cured uterai. My plan for treating eversion of the uterus is as follows:—

Wash off with quite warm water any filth that may be present. Then with clean hands raise the whole mass while an assistant places underneath a clean piece of cloth which has been covered with white granulated sugar. I then cover the uterus, being careful to fill each fold of the membrane. After a few minutes we see small streams of serum running off. At this point, knead and press between the hands, applying sugar to the parts that have been washed clean until the uterus becomes soft and small enough to be put back without much trouble. Be sure the parts are in proper position and keep them there by suture or otherwise. The sugar not only reduces the parts, but as the serum passes out, it washes the uterus more thoroughly than can be done with a sponge. I suppose some will wish to know where I get the sugar.

Perrysburg, O. LOUIS CHAPMAN.
—*Amer. Jrnl. Vet. Med.*

RECTAL ANÆSTHESIA.

ALOI (*Rif. Med.*, October 9, 1920) has anæsthetised dogs by giving rectal injections of ether and olive oil. As the result of his series of experiments, he says that the harmful effect of ether on the intestinal mucosa cannot be avoided. Superficial inflammation is set up, or a marked dryness of the mucosa, which may even crack and bleed, leading to tenesmus, bloody diarrhœa, and proctitis. These changes in the rectal mucosa are transitory when the narcosis is only short and the rectum well washed out afterwards. The epithelial layer is unchanged. In dogs, at any rate, it was very difficult to obtain deep narcosis of prolonged duration.—*British Med. Journal.*

PYOSEPTICÆMIA OF NEW BORN FOALS.

BY PROFESSOR M. L. PANISSET.
Of the Lyons Veterinary School.

RESEARCHES in the etiology of arthritis ought to have, as a result, the setting up of a specific therapy founded on a consideration of the facts acquired with regard to the cause of the ailment. Authors have not failed in this respect. Some, considering that there is a connection between the state of the mother and the infection of the new born, have proposed a therapy derived from preventive substances developed in the blood of the dam; others have thought that the product in utero may be vaccinated by immunising the mother and prolonging the resistance thus conferred by treatment undertaken after birth. Some experimenters have limited themselves to treating the foals only as being affected.

A Swedish veterinarian, Forsell, conceived the idea of treating the arthritis of foals with the serum of the dam. This method is based on the assumption, defended by Schule, and supported by other experimenters, that there is a congenital origin of the infection. Forsell uses the serum of the mother at once as a preventive and curative. His plan has been investigated by Mann. Of 22 foals treated, 15 have been cured. As a preventive the serum has been used on 12 foals; one only became slightly ill and was rapidly cured. Mann used intravenous injections of 4 to 500 cubic centimetres of the serum. Karreng also obtained excellent results, and Sonnenberg says that four foals have died out of 65 he has treated. Forsell's plan has been greatly welcomed by Swedish veterinarians. To overcome the undoubted difficulty of collecting 500 cubic centimetres of serum in practice, Forsell recommends the use of citrated blood. The product neither coagulated nor cooled, is injected into the vein after being filtered. The congenital origin of the arthritis of foals being more than improbable, it would seem that there is little chance that the serum of the mother will be endowed with specific properties.

Antistreptococcic serum is employed against the arthritis of foals since Ostertag stated that the streptococcus is the most common cause of the affection. Numerous experiments have shown the little value of this serotherapy, and the recent experiences of MacFadyean and Edwards give evidence in the same direction. Magnusson has not been content with utilising the serum, but has had recourse to sero-vaccination. The preventive value of this medicative was such that in 1916 hundreds of doses of sero-vaccine were distributed without it being known that a single foal treated preventatively died of streptococcic infection. The curative action of the process is less regularly favourable. A complete study of the etiology of arthritis has shown to Magnusson the many causes of the malady, and hence the author recommends the use of a mixture of antistreptococcic and anticoli bacillary serum associated with an antistreptococcic vaccine; the results are excellent; 500 foals have been protected without any failures. Magnusson considers, from his experiments, that foals which show grave arthritic lesions with fistulæ or numerous intra-muscular abscesses are not suitable subjects for treatment. Foals which are ill from birth ought to be submitted to antistreptococcic and anticolibacillary serum therapy or to anticolibacillary therapy only; the dose of the serum should be from 50 to 100 cubic centimetres. When foals become ill at the end of the first week use dose raised from 100 to 200 cubic centimetres of antistreptococcic serum only. In all cases the injections ought to be intravenous.

Preventive inoculation practised as we have indicated under the form of sero-vaccination gives good results, and ought to be used in all places where the appearance of arthritis is the rule. Whatever may be the efficacy of one or other of these methods, one has always to count on failures due to *bacterium viscosum equi* and other microbes than the colibacillus and streptococcus. The arguments furnished in favour of a relation between the infection of the mother and that of its product are without doubt only applicable to certain cases, and their recognition does not justify us in giving up a method of prevention whose value has been established by a long and frequent experience. In all cases measures destined to prevent infection of the umbilical cord should never be omitted.—*Rev. Gen. de Med. Vet.*

G.M.

Reviews.

ANNUAL REPORT OF THE VETERINARY COLLEGE, CIVIL VETERINARY DEPARTMENT, PUNJAB, AND THE GOVERNMENT CATTLE FARM, HISSAR, FOR THE YEAR 1919-1920.

HIS HONOUR, the Lieut-Governor of the Punjab, in submitting a copy of the Report to the Supreme Government of India, pays a just and feeling tribute to the services rendered by the late Colonel Farmer, C.I.E., whose health broke down towards the close of the year under report. When he went on leave it was hoped that rest, if it did not restore his full energy, would at least prolong his life. But, alas! news came of his death, adding another brick to the foundation of the road over which is laid the great line on which runs the Political Engine of Great Britain. In Colonel Farmer the Government has lost a very capable officer, and the Department and the people of India a most sympathetic friend.

Lieut.-Colonel Walker took over charge of the post of Principal in July, 1919, from Colonel Pease, who thus terminated a connection with the College that extended over twenty-one years, during which great development and advance resulted from his ability and energy. Mr. Burke, I.S.O., Professor of Surgery, also retired with a meritorious record of thirty-seven years' service in the Veterinary Department.

Eighty-one new students were admitted to the College, against seventy-eight in the previous year. The Government of India has approved of the revised course of Studies, which demands better educational qualifications from the students who enter. The question of affiliation of the College to the Punjab University, and the question of a Veterinary Faculty is under the consideration of the Government.

There was a very high mortality from contagious diseases amongst cattle, rinderpest accounting for 42,155 deaths, against 20,842 in the previous year. This is attributed to a low vitality, consequent on shortage of fodder, which decreased the ability to resist disease. The number of deaths from foot and mouth disease was 2,592, against 536 in the previous year, and hæmorrhagic septicæmia was responsible for 6,319 deaths, against 5,349.

Vaccinations against hæmorrhagic septicæmia are increasing in popularity, but, owing to a shortage of serum, inoculation against rinderpest had to be restricted. The effect of this was serious, and it is noted that Government has urged that local officers will insist on prompt reports of the outbreak of disease.

Amongst equines, fifteen cases of glanders were dealt with in Gurdaspur district by the Civil Veterinary Department, and three cases in the Rawal Pindi District by the Royal Army Veterinary Department. Surra was prevalent in some of the districts, and the steps taken by the Department to combat this disease, in spite of the shortage of staff, are creditable.

There are now in the Punjab 131 Veterinary Dispensaries. These institutions are increasing in popularity, and there is room for many more. Private munificence should be forthcoming to supplement public expenditure in this direction. There should be no difficulty whatsoever in raising money, especially in a Province like Punjab, where the agriculturist's stock-in-trade consists, to a large extent, of his cattle. All that is required is an influential lead, and it will be readily responded to by the merchants; they are the ones most interested, for cattle are the back-bone of their existence. So much so that Cattle Insurance Societies are being promoted in several districts of the Province, and it is satisfactory to find that the question of a financial guarantee by Government will shortly be referred to the Government of India.

The progress already achieved in cattle-breeding is largely due to the advice and supervision of the Civil Veterinary Department. The number of stud bulls working in the Punjab increased by eighty-two to 1,352, and 198 bulls were sent out by the Government cattle farm at Hissar. It is, indeed, satisfactory that the Chief Superintendent is hopeful of reviving the breed of Dhanni bulls.

The sheep results seem excellent. The popularity of three-quarter and half-bred merino rams continues, as evinced by the fact that the Hissar farm supplied a hundred and ten rams to private individuals, and three to the Jullunder District Board.

Mr. Branford is to be congratulated on his successful management of the Hissar cattle farm, and the officers of all grades of the Department have certainly won the thanks of His Honour the Lieut.-Governor for the efficient manner in which they have discharged their respective duties.

E. V. D. H.

We have before us the report of the Chief Veterinary Officer of N. Nigeria for 1919. For those whose imaginations carry them beyond these islands, and especially for those on whom Africa has cast her spell, it will prove interesting reading.

General.—We are informed that certain natives have received elementary instruction on live stock. After two years' observation it is considered that a very elementary instruction on stock subjects, until the general education has been vastly improved, has produced the best results, provided efficient supervision by a white man is available.

10. *Control of Contagious Disease.*—Rules for the control of contagious disease were promulgated more than three years ago, and copies

of these rules in Hausa were furnished to Emirs for circulation. Up to the present no very great result has been noticed. One is reminded of the controversy *re* white whole-time and part-time veterinary inspectors at home by the following passage: " While the responsibility of the district heads would be the same, the presence of a Native Stock Inspector in his district, whose sole work would consist in inspection of stock, would relieve the District Head of a very considerable amount of work which, if carried out by him, would render him unpopular with the people, with whom it is to his interest to keep on good terms." The importance of the assistance of the Native Police is insisted upon, while the effects of tribal sympathy and bribes are mentioned.

It is satisfactory to note that the reporting of contagious disease in districts where Native Inspectors are stationed is more satisfactory than in other parts.

Veterinary Officers.—During the year not more than one Veterinary Officer was in N. Nigeria at the same time.

Disease.—Rinderpest is the greatest scourge of the country. " The mortality in Kano Province amounted to 366,335 cattle, and as the returns for cattle in Bornu Province for 1919 are 237,587 less than those for 1918, it may be estimated that half a million head of cattle in these two provinces alone succumbed to rinderpest."

As the value of these cattle is about £5 per head, this represents a loss of approximately £2,500,000. The next more important diseases are pleuro-pneumonia, foot and mouth disease, trypanosomiasis and Septicæmia hæmorrhagica. With regard to trypanosomiasis the increased trade and the annual movement of Fulani herds from South to North make it likely that the spread of the disease will continue.

One can imagine the difficulties thrown upon the Veterinary Department by a tribe of wandering natives (the Fulani) continually treking through the country with large herds of cattle.

" 25. *Other Diseases.*—Among diseases which are suspected to exist in the country are blackwater, anthrax, and tick-borne diseases, but without a laboratory and an adequate veterinary staff it is doubtful if much headway will be made in the discovery of these and other obscure diseases."

" 28. It is understood that a sum of money has been approved by the Secretary of State for the commencement of a laboratory, and it is sincerely hoped that other essentials towards dealing with contagious disease in an effective way may be approved in the immediate future."

In conclusion, it certainly seems a reasonable hope of the Chief Veterinary Officer that more facilities, including more trained veterinaries, should be forthcoming; moreover, especially taking the figures on rinderpest into consideration, such a procedure would appear to be merely a sound commercial investment for the country.

J. M. A.

FIGHTING SPORTS. By CAPT. LAWRENCE FITZ-BARNARD, M.R.C.V.S. Published by Odhams, 29, King Street, Covent Garden, W.C.2. Price £1. 1s.; 291 pp., with 10 Coloured Illustrations and 11 Figures in the Text.

THIS book, which deals with the fighting qualities of men and animals, will prove highly interesting to those of sporting tastes, as the author has had a very extensive experience.

Of the history and literature of cock-fighting Capt. Barnard writes with a thoroughly practical knowledge, and he is an undoubted authority on this most ancient of English sports.

In dealing with the subject of man-fighting, Capt. Fitz-Barnard says: " If properly managed it should give exhibitions of gameness and fortitude, and the never-say-die spirit (can we say this of the modern glove contest ?), of infinite value to the spectators, so that their pride of race should be fostered and they should learn to endure what they have seen."

This, of course, is a comparison between fighting conducted under old prize-ring rules and boxing as conducted at the present time with gloves.

I have to disagree with the author on this opinion, since the modern intellectual enlightenment which finds its expression in humanitarianism, must undoubtedly associate itself with protection for the combatants' hands, so that he should in most instances be able to continue to exhibit the science in its true value. The old style of prize-ring fighting was too difficult of management, science was largely sacrificed, and mere ferocity indulged in.

This book will prove an invaluable addition to every sportsman's library, since, viewed from the two-fold aspect of record and exposition, it has achieved what no other work has ever attempted, and I have every confidence it will receive the success it rightly deserves.

W. S. K.

Parliamentary.

HOUSE OF LORDS.

WEDNESDAY, MARCH 23.

Danger of Smuggled Foreign Dogs.

LORD BLEDISLOE asked the Government whether there were good grounds for suspecting that during the last few months dogs had been smuggled into this country from abroad, thus evading the quarantine regulations and constituting a source of danger to the community in the matter of the transmission of hydrophobia; whether the maximum penalty for such evasion was for the first offence only £20; and whether, seeing that such a fine, in the absence of any discretion on the part of the Court to substitute imprisonment therefor, was an insufficient deterrent to many such offenders, the Government would so amend the Diseases of Animals Act, 1894, as to empower the Court to impose in the case of a first offence the more drastic penalties provided thereby in the case of a second or subsequent offence. It seemed, he said, to be the fashion to breed as small a dog as possible of the varieties known as Pomeranians, Belgian griffons, Blenheim spaniels, and more particularly Pekingese, so that it was comparatively easy to smuggle into this country in ladies' muffs, or in small portable basket, dogs arriving across the Channel. There was also the danger, which was becoming a very real risk, of possibly larger dogs being transported to this country by aircraft, and more especially military aircraft. This suggestion was strengthened by the location of the various confirmed outbreaks of rabies, as published by the Ministry of Agriculture. During 1919 there were 155 confirmed cases of rabies, largely in the South and West of England, and more or less in the neighbourhood of the camps; and in 1920, although the number was considerably reduced, no more than 42 outbreaks having taken place, much more than half those were in Wiltshire, which, of course, comprised Salisbury Plain, and in the three adjacent counties. Only five took place in all the rest of England. In the early part of this year the Army Council issued an instruction prohibiting the embarkation of any dogs with soldiers on transports or upon other means of conveyance to this country without a licence from the Minister of Agriculture. In the meantime, however, harm seemed to have been done by this illegal smuggling. A month ago the Masters of the Foxhounds Association passed a unanimous resolution urging the Government to take steps against this illicit importation of possibly diseased animals. A rabid dog was very seldom found wearing a muzzle, and it was therefore questionable whether muzzling, carried out sporadically in certain areas only, was an effective preventive of the spread of rabies.

LORD WILLOUGHBY DE BROKE, in supporting what Lord Bledisloe had said, remarked that not long ago a whole pack of foxhounds had to be destroyed. It seemed to him that lovers of Pekingese and Belgian griffons and such dogs appeared to lose all sense of public spirit in this regard, and it would be a great advantage if the Minister of Health would look into this matter and offer some kind of advice to the public against these dogs being allowed to lick dishes and plates in public restaurants as he had seen them do.

THE EARL OF CRAWFORD (Chancellor of the Duchy of Lancaster) said, with regard to the danger of smuggling dogs into the country by aircraft, he was informed that the Department of Agriculture, which had given the closest attention to the subject, had made inquiries and had satisfied itself that public aerodromes were now very well watched. The Department, however, was quite conscious that some smuggling might be attempted, and they were taking steps, which he would not particularise or describe, to reduce that danger to a minimum. As regarded fresh legislation, for the time being at any rate, the Board of Agriculture was of opinion that the present penalties, the danger of the quarantine, the guard of the Customs, and so forth, could be relied upon to keep disease out of the country ; but if any evidence were forthcoming of fresh attempts to use the aeroplane for this specific purpose, the Ministry would be quite prepared to ask for increased penalties.

HOUSE OF COMMONS.

TUESDAY, MARCH 22.

Army Veterinary Service.

SIR L. WORTHINGTON-EVANS (Secretary for War) informed COL. SIR A. HOLBROOK that the question of the amalgamation of the Army Veterinary Service with the Remount Service was not a new one. He was informed that it would not be practicable for the Army Veterinary Service to perform the duties of the Remount Service in addition to their own duties, and it was not considered that a saving would accrue from a combination of the two services even if this were feasible.

NOTICES.

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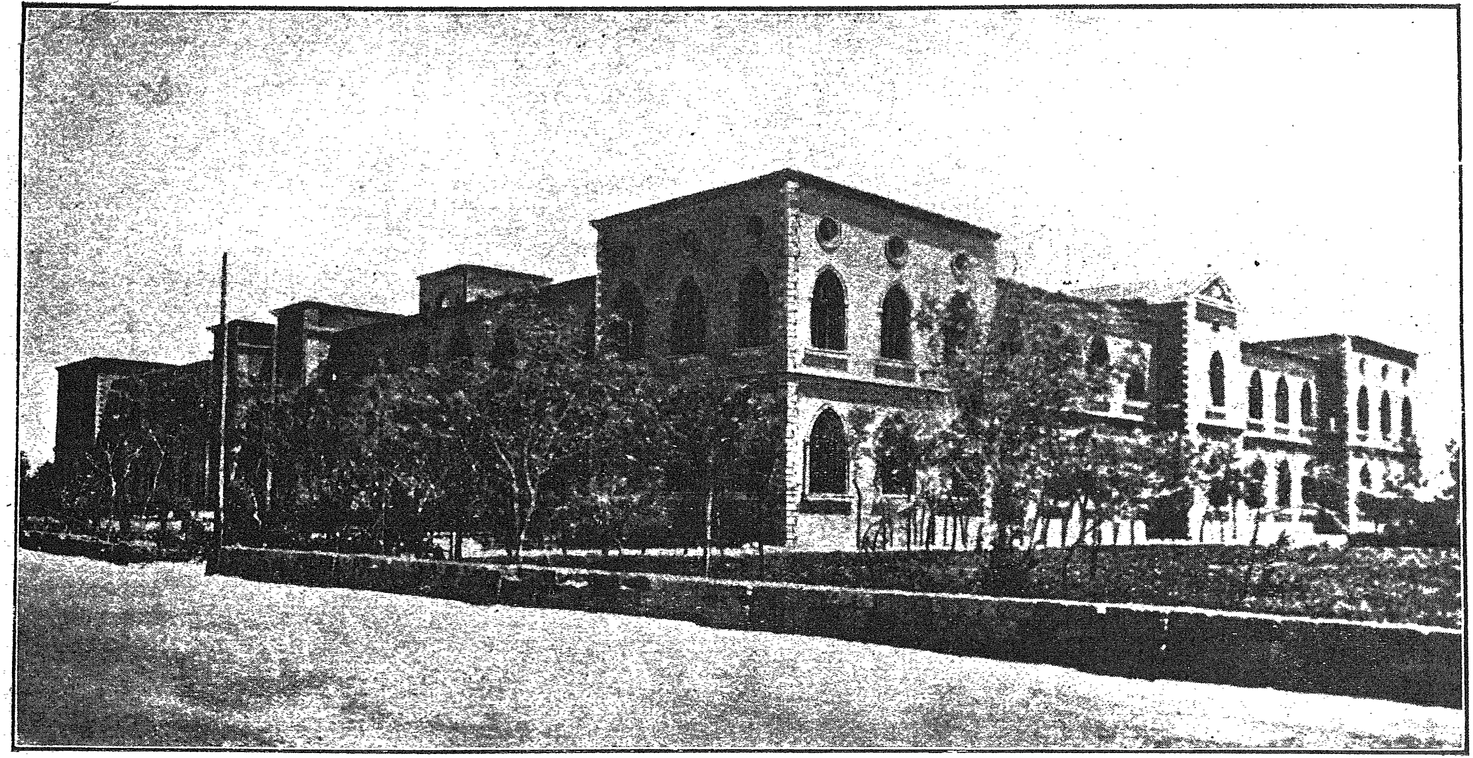

THE GORDON MEMORIAL COLLEGE, AT KHARTOUM, IN WHICH THERE IS A VETERINARY RESEARCH LABORATORY.

THE

VETERINARY JOURNAL

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JUNE, 1921.

Editorial.

EGYPT AND THE SUDAN.

THE annual reports of the P.V.O. of the Egyptian Army and of the Director of the Veterinary Department, Sudan Government, for the years 1919 and 1920 have lately come under our notice, and it is interesting to observe the evidences of scientific progress and the valuable nature of the veterinarian's effort in these out-lying parts of the Empire.

The reports in question are both furnished by Lieut.-Col. J. B. Tapley, D.S.O., who ably combines in his person both the above offices.

If fears of encroachment upon our rightful professional sphere, or of belittlement of our scientific value or status, trouble us at home from time to time, no such thoughts disturb as we glance through the pages of the records of service rendered to the State by the Veterinary Department in Egypt and the Sudan.

It is a trite observation that no one is indispensable, but the soundness of the aphorism may well be doubted as applied to the veterinarian where the development and welfare of the semi-civilised country is concerned and its conversion to anything even approaching settled and prosperous conditions.

In such lands the advancement of the country is inseparably bound up with the welfare of its live-stock, and its inhabitants judge the prosperity of the land not according to modern standards of wealth, culture, or form of government, but rather as Moses judged in his pronouncement: "Blessed shalt thou be in the fruit of thy cattle and the increase of thy kine and of thy sheep."

Conditions of life among the nomadic tribes of the Sudan are to-day much as they were in Mosaic times, and it is probable also that their animal diseases have throughout the ages remained equally unchanged in character and uninfluenced by measures of State control or scientific repression right down to the advent of the British veterinarian within the last decade or so. This appears the more strange inasmuch as the office of the veterinarian was well recognised in Egypt some 3,000 years ago—as several papyri testify—although evidence is nowhere found as to his employment in his more important role, as a man trained to repress as well as cure disease. "*Tempora mutantur*"—and the Pharaoh of to-day, when his live-stock are threatened with "a very grievous murrain," sends for his P.V.O. and the plague is stayed.

That at least is our impression on looking through the pages of the Egyptian and Soudanese Veterinary Reports, which contain—*inter alia*—so formidable a list of epizootic and enzootic diseases as to make one wonder why, with such a wealth of material at hand for a more extended list, the original plagues of Egypt were limited to only ten in number.

Statistics for such maladies as horse-sickness, trypanosomiasis, East Coast fever, or filiariasis show the incidence of the more essentially tropical type of disease, while epizootic lymphangitis, pleuro-pneumonia contagiosa, foot and mouth disease, rinderpest, etc., add a formidable weight to the list of diseases which have to be coped with. Dashes of local colour, so to speak, are provided by such items in the list as "Killed by lions," "Snake bite," "Fell down wells," etc.

In a land where the camel is the chief beast of burden, it is not surprising to find a special casualty list devoted to this animal. Thus in the Egyptian Army for the year 1919 we note about 240 camels died from various causes and 120 were cast and sold, while in 1920 about 500 died or were destroyed and 44 were cast and sold, an increased casualty list over the previous year owing to losses on active service with patrols "working under adverse conditions" in Southern Soudan. Of the total deaths in 1920 as many as 211 were due to trypanosomiasis, while it may be conjectured that a good percentage of the 135 cases dying from causes "not stated" were due to the same malady.

It will thus be seen that this disease exacts a heavy toll from the camel in the Soudan. The exact species of trypanosome is not mentioned, but it is probably the *T. soudanese* of Laveran, spread by flies of the Tabanus or Stomoxys family, such as cause the disease "Tahaga" in dromedaries in the upper Niger, and "Zousfana" in horses in South Algeria. It appears possible, however, that the trypanosome may be the *T. congolense* (Nanum), of which the carrier is the *G. morsitans*, the same fly which is the vector in the "tse-tse" disease of lands further south; but whatever the exact species of blood parasite, the toll exacted from the bactrian is evidently a heavy one.

The camel, indeed, appears the only beast of burden adapted by nature and habit to the country, for the horse and mule are susceptible both to horse-sickness and trypanosomiasis, while the donkey, which is more resistant to horse-sickness, is slow for transport purposes and can carry only about a fourth the load of the camel. That the donkey is not only extensively employed, but bears his full load of the ills incidental to State service, will be seen from the fact that the casualties of the Egyptian Army under this heading were 1,128 in 1920, while the wastages of the horse and mule were 115 and 209 respectively, of which latter figure the disease horse-sickness was responsible for 61 deaths amongst the mules alone.

Most significant, however, of the difficulties of veterinary administration in the Egyptian Army is the return for 1920, showing that the percentage of loss and wastage amounts to 26 per cent. of the total animal strength. To those who have experience of the responsibility of veterinary administration in distant and unsettled lands such figures speak eloquently .

Privations due to long forced marches under a torrid sun, shortage of water and often of food, flies, torrential rains, swamps and engulfing mud, the general absence of made roads, and endless travel on hot and shifting sands, these are normal conditions of service, sufficiently exacting to the patient beast of burden without the prevailing dangers of the deadly fly or pathogenic tick, etc.

To those who know, the wonder is, not that the total percentage loss from disease and wastage is so high, but, rather, that it should be kept at so low a figure as 26 per cent.

The staff of veterinary officers—some eighteen in number—doing duty with the Egyptian Army appear to undertake also the civil duties of the Veterinary Department of the Sudan Government, and to be responsible for the control of animal disease over an approximately equal number of provinces, many of them of enormous extent. Here the control is attempted of such diseases as rinderpest, pleuro-pneumonia and East Coast fever, an attempt which seems to secure a large measure of success, especially in the control of rinderpest, a disease which appears enzootic.

Veterinary control over nomadic tribes, sceptical as to the motive and utility of the preventive measures urged upon them, and intolerant of anything in the nature of quarantine measures, must constitute in itself a problem calling for the exercise of unusual skill and tact.

We congratulate our professional brethren who are doing such excellent work in Egypt and the Sudan, and we are glad to see that the Egyptian authorities are so alive to the value of the work performed as recently to confer upon the P.V.O. and Director—Col. Tapley—the decoration of the Order of the Nile.

We offer him our congratulations upon this honour, and also upon the valuable and successful work undertaken by him and his colleagues as reflected in the reports under review.

The frontispiece shows the Gordon Memorial College at Khartoum, containing the excellent veterinary laboratory wherein much of the work of diagnosis and research for the Veterinary Department is conducted.

General Articles.

ORGANOTHERAPY AS KNOWN TO THE ANCIENTS.

The treatment of disease by means of animal extracts is as old as the history of literature. Its modern application dates from the treatment of thyroid insufficiency by means of extracts of thyroid gland, since when considerable extension of this method of therapy has taken place. The subject, however, is still largely in the experimental stage, and it will be some time before the real facts are ascertained.

The old writers had immense faith in the administration of animal extracts. In 1551 Conrad Gesner (1516-1565), a physician and scholar of "prodigious learning," began the publication of his "History of Animals," and in this work, among many other subjects, he collected from ancient writers whatever bore on the subject of the treatment of disease by the administration of the body tissues of animals. This book fifty years later was translated into English by the Rev. Edmund Topsell, Curate of St. Botolph, Aldersgate, London. Topsell was an enthusiast; he appears to have regarded the translation of Gesner's immense and learned work as a Divine duty. He brought no technical knowledge to bear, he was merely a translator who worked under acute difficulties, for he tells us he was paralysed in the right hand. We are indebted to Topsell for a knowledge of the position of affairs in Europe in the middle of the 16th Century, for, judging by the text, there is nothing to indicate that Gesner, a physician, differed from the views of Pliny, Hippocrates, Æsculapius, Galen, and a host of minor men on whom he depended for his information. In the text the treatment of disease by animal extracts is considered under the titles of "The Medicines Arising out of Horses," "The Medicines of the Several Parts of Oxen and Kine," "The Medicines of Wild Swine," ditto of Sheep, ditto of the Ram, and of the Lamb. I only propose to reproduce what Gesner has to say in connection with horses and cattle.

"THE MEDICINES ARISING OUT OF HORSES."

"The blood of a horse gnaws into dead flesh with a putrefactive force." [It is not very clear what is here intended to be conveyed, especially in the face of the next sentence.] "It very much makes and helps against impostumes and small bunches which arise in the flesh." [It must be remembered that the diseases prescribed for were those of man and not of the horse, though animals are occasionally referred to. By impostumes and bunches are perhaps intended abscess formations and swellings of various kinds, probably mainly scrofula.] The blood of young horses and asses is very good against jaundice and the overflowing of the gall. If blood be swallowed it will destroy and consume the maw (stomach) worms. In pestilence among horses blood and salt are given to the sick, and both internally and externally "horse leeches" use the blood in the treatment of different diseases. In man and animals it is employed in fractures and dislocations. A horse exhausted by work should have blood drawn from the womb, mixed with oil and wine, heated to lukewarmness, and smeared over the body. [We are not told what alternative to adopt if the animal does not possess a womb.] Stiff joints in horses are to be "anointed" with hot blood. The flesh of grass-fed horses was employed in the treatment of snake-bite, but we are not told how. Boiled horse flesh is recommended as a useful medicine in many diseases which are not specified. The fat of the horse is used by women to increase the growth of the hair, while marrow is good to loosen contracted tendons.

The teeth of an entire horse placed on the head of one liable to nightmare prevents it. Teeth are also found useful in the treatment of chilblains. The milk teeth of a horse stop toothache. Shed milk-teeth fastened upon children during infancy procure easy dentition, especially if the teeth have never touched the ground. Crushed and sprinkled upon a man's genitals "doth much profit and effectually help him."

Occasionally we find the author straying away from the subject of disease, for we are told that a horse-hair fastened to the house of a "man's enemy" prevents flies or gnats from flying past his abode.

The dried tongue of the horse ground to powder cures pain in the spleen of man or woman.

The genitals of the horse cure "sores and pains within," and is good for diarrhœa; also in the dried and powdered condition it is an excellent remedy for the "seconds" (seccundines) of a woman.

In the heart of the horse is a bone like a dog's tooth; this drives away all grief or sorrow "from a man's heart."

Hoof dust disperses abscesses and little bunches (scrofula ?) which arise in the flesh. The dust of the hoof of the ass mixed with oil water and hot urine, expells all wens and kernels in man or woman. The ashes of the hoof give great relief in colic or stone, also by a perfume which may be made from dried hoofs a dead child may be expelled from the uterus. The scrapings of the hoof mixed with urine, and poured into a horse's nostrils, promote the secretion of urine.

The milk of mares expells poisons and acts as a purgative. The testicles of a pig, mixed with mare's milk, is an admirable remedy against falling sickness (epilepsy). The milk of the mare is invaluable for clearing the womb of " any filth or matter." It also renders barren women productive, assuages labour pains, and expedites the delivery of a dead child. If the seeds of henbane be added to milk and fastened to the body with a piece of deer's skin, conception is prevented. The last milk drawn from the mare purges. Mare's milk and honey removes pain from wounds of the eye. Cheese made of mare's milk removes all abdominal pain.

A comb " anointed " with horse's sweat and applied to the hair stops its further growth and prevents it turning grey. Pain and difficulty in hearing are relieved by the application of horse's sweat; also pain in the mouth and throat is removed if the sweat from a horse fed on barley or oats be applied to the part, which has previously been washed over with the juice of young green sea-crabs. The sweat of a horse drives away a cough. [It would have been interesting in the present state of our knowledge of asthma had the reverse been stated.] The sweat of a horse cures consumption, but according to some the horse dies shortly or immediately afterwards. Sweat mixed with urine causes a woman in labour to be relieved of a still-born child. The sweat of the horse, and, according to some, of all animals, " breeds wind in a man or woman's face and brings the quinsy " ; it also causes their sweat to " stink." A sword or knife heated to redness and " anointed " with the sweat of a horse, produces a wound which is mortal from hæmorrhage. A horse wounded with an arrow may be cured by administering a mixture of sweat from another horse, bread and man's urine, and the same applied with horse-fat to the wound. The sweat of the horse mixed with urine, if drunk, will drive out of a man " the belly worm or serpent " (round worms) which may have crept into his belly. [The text here indicates the belief that these parasites were taken in as such from without.]

The dung of a horse or ass fed upon grass, if dried and dipped in urine, is a good remedy against the sting of a scorpion. The same medicine, together with the genitals of a horse in vinegar, is good against the scorpion or shrew-mouse. [At this point there follows a statement about the poison of the mad dog, of which I can make no sense.] The dung of a horse while fresh and warm, applied to a wound stops bleeding; it also drives away corruption in men's bodies if applied to the diseased part. Mixed with oil of roses and applied to the ears it drives away pain and improves the hearing. The dung of an old horse boiled in water, and given to one "troubled with water in his belly, doth presently make vent for the same." An excellent remedy against colic or stone is a handful of dung from a horse fed on oats or barley, but not on grass, mixed with half a pint of wine and reduced to half its bulk by boiling. Horse's dung incinerated and mixed with urine will cure ague and quartan fever. In retention of urine in man pour into the nostrils a mixture of horse's dung mixed with urine.

Cattle which void blood through the nostrils or urinary passage may be treated by making a paste of wheat flour, butter and urine from a horse recently watered; give the paste baked "even to ashes." Horse's urine mixed with water from a smith's trough is a remedy against epilepsy.

The chestnuts on the limbs of the horse were employed in treating epilepsy, after being powdered and mixed with vinegar. It is described as an "excellent preventive." Mixed with oil and poured into the ears it tightens up loose teeth; mixed with claret and taken for forty days it drives away stone or colic.

The following is a summary of the section dealing with the medicines and several parts of oxen and kine. Horn powdered and administered cures cough and consumption; mixed with vinegar it helps the morphew (morphea, a skin disease); infused into the nostrils it stops bleeding; mixed with warm water and vinegar "it wonderfully worketh upon the splenitick passion."

The powdered hoof placed on the King's Evil (scrofula) helps it; the same burned and mixed with milk increases the flow of milk in a woman. The dust of the heel of the ox (ergot of fetlock) mixed with urine tightens loose teeth and removes toothache. The powdered ribs of an ox controls an excessive menstrual flow. The ankle of a white cow steeped in urine for forty days, when applied to the face takes away spots and clears the skin. Ox leather burned and applied to purple faces cures them. Marrow and suet help strains of sinews. Suet helps against leprosy, blotchiness and scurvy; with goose grease poured into the ears it helps deafness. The blood of the ox cures scabies in the dog.

Regarding the therapeutic value of milk, it is said that "volumes might be written" on the subject. It was given in the treatment of consumption, cough, "hardness of the belly," and in all manner of poisons; in sore throat it was used as a gargle; for pain in the stomach "caused by sadness or melancholy" we are instructed to drink cow's milk in which a stone has been placed.

It is stated that in the head of the ox is a little stone which, when in fear of death, "he casts out of his mouth." If this stone be taken it eases dentrition in children. In the second stomach of the cow is "a round black tophus" of no weight (hair ball ?) which is "very profitable" to women in difficult labour. Dried liver cures the flux of blood (dysentery ?). The gall of the cow is more active than that of any animal; mixed with honey it draws out thorns, the point of a needle, or other "iron thing" in the flesh. It prevents the growth and spread of the King's Evil. Hands washed in gall are made white, "no matter how black they be." If "purblind" eyes [short sight] be anointed with the gall of a black cow, writing may be more plainly read. "There is in ox gall a certain little stone like a ring, which philosophers call Alcheron; this stone, powdered and held to the nose, clears the eyes." A small quantity mixed with beech juice is good against epilepsy. In deafness take the gall of the ox and the urine of a goat (no dose given). The spleen of the ox taken in honey eases pain of the spleen in man. "The skin that a calf casts out of its dam's belly takes away ulcers of the face." [No information is given as to how the remedy is to be employed.] The urine of the cow "taken in gargarizing" cures "intolerable" ulcers of the mouth.

The end of the section is devoted to the therapeutic uses of the dung of cattle, especially in the treatment of gout and dropsy.

The "medicines" furnished by other animals of the farm are either of little interest or a variation of those already reproduced.

F. Smith.

THE TREATMENT OF FLY-STRUCK CATTLE.

By H. E. HORNBY, M.R.C.V.S.

(*Northern Rhodesia*).

In an article under the above title, published in the *Rhodesian Agricultural Journal* of October, 1920, I drew attention to the favourable results which can be obtained when infected cattle are treated systematically with intravenous injections of tartar emetic.

The trypanocidal action of tartar emetic was discovered in 1907, and since that year many thousands of human beings and animals infected with trypanosomes have been treated by its aid; in some cases successfully, more frequently unsuccessfully.

I have spent the last seven years in countries devastated by trypanosome diseases, and during that time I have experimented with all the common drugs for which trypanocidal action has been claimed. The conclusions arrived at by me in 1919 appeared that year in the March number of this journal. Briefly, they were to the effect that no good results can be expected when T. brucei disease is treated with tartar emetic, but that the other two common African trypanosomes—T. congolense and T. vivax—are susceptible to its action. As cattle are immune to the polymorphic parasite, this means that all cases of trypanosomiasis of cattle met with, in at any rate South-Central Africa, are due to parasites susceptible to the action of antimony, and that these cases, therefore, can be treated with some hope of success.

In the younger Colonies the relation between a veterinary surgeon and stock-owners is different to the one that exists in England. There are no private practitioners, and so the Government veterinary surgeon is justified in imparting technical knowledge to laymen if by that means he can assist the object of his existence ; the manitenance in health of the stock of the country. In England no practitioner would be justified in instructing farmers how to give intravenous injections of irritant drugs, but then, in England, a practitioner is not the only veterinarian in an area as large as Great Britain. At one period of 1920 I was the only veterinary surgeon in the whole of North-Eastern Rhodesia, Nyasaland, and Portuguese East Africa, north of the Zambesi, and I had work to do in all three countries. Consequently, when I gave the following advice to farmers whose herds were in danger of infection by trypanosomes I was not acting unprofessionally, but, as I think, in the best interests of my profession. My advice to such a one was :—" Provide yourself with a syringe, tartar emetic powders and knowledge of how to use them. Keep a strict watch over your herd, and on the first suspicion of the disease making its appearance inject the affected animal. Do not wait to be sure that it is infected ; if you give the injections carefully you will do no harm even if your diagnosis is at fault ; the only ill-result which follows a course of correctly-given injections is a temporary fatty degeneration of the viscera ; a cow is not even put off her milk. It is true that occasionally a beast collapses and dies immediately after receiving an injection, but such cases do not amount to 1 per cent. of those treated. After giving an injection make a mark on the horn with a file, and when six injections, as shown by six file-marks, have been given, discontinue treatment for three weeks. If successful the animal will commence to pick up from the date of the last injection and will soon present an appearance similar to that of others in the herd. Even so it is advisable to give an injection once a month for the next six months. Should it not pick up rapidly, then destroy it if it is the only one; if there are more than one they can form a sick herd, to be kept apart from the healthy animals, reinjected, and disposed of to the butcher when fat. Good feeding is an essential part of the treatment. While undergoing the course of injections a beast is not dangerous to others, nor is it so long as it is undoubtedly picking up or looking well. Be always on the look-out for relapses, though; they can be recognised by a recurrence of the original symptoms. Until we know whether by treatment with tartar emetic we are able to bring about a permanent cure, it is advisable to make use of any opportunity which may arise for the profitable disposal to the butcher of any cured animal. At the present time it is dishonest to sell for any purpose other than immediate slaughter a beast treated and recovered, unless you inform the buyer of the risk he takes of introducing a serious disease into his herd.

"Transport riders should remember that the conditions under which they work are conducive to the mechanical spread of the disease among their oxen; they cannot, therefore, be too vigilant in their watch for symptoms nor too hasty in commencing the treatment of suspicious cases. An injected beast can work the same day."

The dose recommended was 25 cc. of a 4 per cent. watery solution. I had a syringe and needle manufactured to my design, so that the operator could dispense with the services of any assistant other than his native servants. The course of injections was six, with five days between each injection. I taught a few selected stock-officers, farmers and conductors how to give the injections, and they, in turn, taught others. Consequently, to-day, this method of treatment is in wide use throughout, at any rate, north-eastern Rhodesia.

The object of this article is to place on record the result of the treatment of his herd by a stock-owner who was a careful observer and a good operator. It has the value of an experiment, because it was conducted so that the animals could be kept under observation for several months following the termination of treatment, during which time they were not exposed to sources of reinfection. Consequently, any animals showing symptoms of the disease at the termination of the experiment must have relapsed.

Msipazi Farm, in Northern Rhodesia, is ten miles from the nearest fly-belt and had been free from trypanosomiasis during the six years the previous owner was on it. On December 1, 1919, the present occupier, Mr. L. J. Holmes, had a herd of 31 healthy, adult cattle. A beast became infected somehow or other and died on January 5,

1920. By January 17, five more were ill and their blood rich in trypanosomes (T. congolense). By February 10, three more had died and eleven more were sick. On February 26, 1920, only four of the original 31 remained apparently sound. I commenced to treat all the affected animals and administered the first three of the course of six injections. After that Mr. Holmes continued the treatment. The course of the disease had been unusually rapid, so we were obviously dealing with a particularly virulent strain of T. congolense. One animal died under treatment and one was lost in the bush.

At the middle of April, 1920, the herd consisted of 20 treated animals and five untreated ones. The former looked better than they did, but had not progressed as satisfactorily as is often the case. Meanwhile two of the five untreated ones had developed symptoms of the disease, and, as all the cattle had been running in one herd at a time when biting-flies were numerous, we wondered if any of the treated animals had been reinfected by these fresh cases. There is always this danger when one treats a few individuals in a herd ; one does not know whether a treated beast which subsequently succumbs to the disease has relapsed or been reinfected. Accordingly Mr. Holmes and I took counsel together and decided to treat every animal in the herd, and not to introduce any strange beast into their company for several subsequent months, but to keep the herd entirely isolated from other cattle. We thus hoped to be able to determine what likelihood of recovery and of subsequent relapse follows treatment along the proposed lines.

We gave a course of injections to the whole herd, including the 20 which had already been treated in March. It is probable that three or four of the total number were not and never had been flystruck, but it is certain that at least eighteen were definite cases.

The twenty-five animals, consisting of seven cows and eighteen oxen, received their last injection on May 12, 1920.

On November 16—that is, just six months' later—all the animals were in from fair to good condition and nine oxen were sold on that date to the butcher as fit for white consumption.

On January 20, 1921, one cow died suddenly, but as she was fat and in-calf it is unlikely that she died from "fly." The remaining six cows were in satisfactory condition on that date, and four had either calves at foot or were in calf, the two others being very old animals.

Since the sale in November the remaining nine were kept hard at work, with the result that by January 25, 1921, they were losing condition again and two appeared to have undoubtedly relapsed. At any rate, Mr. Holmes, having faith in tartar emetic, decided on that date to be on the safe side and commenced retreatment of all the nine.

Thus the experiment ended and its result is in agreement with my general experience of treatment, which is this :—

A course of six injections of tartar emetic—1 gm. being the dose for an average-sized native cow or ox, which weighs 700 lbs.—given at intervals of five days, rarely fails to ameliorate the course of trypanosomiasis in bovines. A second or third course, commenced a month after the completion of the previous one, may be necessary before a cure is effected. Such a cure is likely to be temporary. When a beast relapses it is just as amenable to treatment as it was in the first instance. When a herd is well removed from all fly-belts it is sound policy to sell to the butcher all treated and recovered animals. On farms close to " fly " where it is impossible to maintain a " fly-free " herd, it is possible to keep a small herd of working and dairy cattle by the regular injection of the cases as they appear ; the farmer runs his cattle in two mobs, those under treatment and those not requiring treatment, and every fifth day or so those in the former lot are thrown and injected, being transferred to the healthy mob when the file-marks on their horns show that they have had their complement of injections.

Since writing the above I have received a letter from the manager of a large ranch who has suffered severely from " fly," and who has had occasion to treat several hundreds of fly-struck cattle. He says :— " I do not agree with your theory that cure is only temporary. The transport oxen which you and I treated in 1919 are in splendid condition, and it is a treat to see the sleek spans pulling their 8,000-10,000 lb. loads. I do not, however, think that six consecutive injections are enough ; I prefer to give a dozen."

Another letter just received from a stock-officer on Tanganyika Plateau informs me that a whole span recovered after a course of six injections.

Undoubtedly, then, tartar emetic is of great value in the treatment of flystruck cattle.

Clinical.

TWO CASES OF NEPHRITIS IN THE HORSE.

By J. F. CRAIG, M.A., M.R.C.V.S.,
Principal of the Royal Veterinary College of Ireland.

THE following two cases are of interest because, although they have many clinical features in common, there are considerable differences in the kidney lesions presented by them.

CASE I.—CHRONIC INTERSTITIAL OR GLOMERULO-NEPHRITIS.

The subject was a three-year-old brown thoroughbred filly.

History.—As a two-year-old she had been put in training, but had overshot her fetlocks in front. Further training was therefore abandoned, and she was sent out to grass with the intention of breeding from her later on. About this time, when at grass, the animal was said to have received a wound on the hind fetlock, and a slight swelling resulted, from which the filly soon recovered.

Three weeks before the animal was admitted to the College a hard, tense swelling appeared on the right flank, and soon afterwards a similar one developed on the left flank. These were thought to be due to the stings of wasps, and were treated with liniments containing ammonia. The swellings rapidly disappeared, but soon afterwards the hind limbs became swollen from the coronets to above the hocks. The swellings were fairly tense, but not painful. Later the skin around the nostril became swollen in a similar way. During this time the filly fed well, but showed distinct debility.

Symptoms.—On examination the animal appeared dull and weak, standing with the eyes half closed and the head depressed. She walked very stiffly, the fetlocks of both fore limbs being overshot. The condition was fairly good. Both hind limbs were swollen from the pasterns to near the stifle. The swelling was painful, pitted slightly on pressure, and the skin in front of the hocks and metatarsus was scurfy and cracked. The tenderness and scurfy condition of the skin was probably due to the action of some liniment. There was also a firm, slight œdematous swelling under the chest between the fore-limbs, which pitted on pressure. The muzzle was also slightly swollen. There was a marked jugular pulse, the jugular vein standing out prominently. The pulse was 72 per minute and rather weak. The conjunctiva was œdematous and deeply congested, as was also the nasal mucous membrane, but to a lesser extent. Respirations were 24 per minute, and the temperature 99.8° F. The cardiac impulse was marked on the left side. On auscultation of the heart the first sound appeared dull and deduplicated.

Blood films prepared from the animal showed nothing abnormal. A sample of urine was examined. It was ropy and clear, of a slight yellowish colour, slightly alkaline, specific gravity 1,030, and contained albumen and mucin. The percentage of albumen in the urine estimated by Esbach's method was .03 per cent. There were few cells present, and no renal casts. There was no sensitiveness shown on manipulation over the loins or on examination of the kidneys by rectal exploration.

The diagnosis of nephritis was made and the owner notified, a very unfavourable prognosis being given.

The animal became steadily worse, fed badly, and lost condition rapidly. The swellings became more extensive and involved the fore limbs, and the eyelids became puffy. In subsequent examinations the respirations numbered 12 per minute, the pulse varied between 60 and 80, and the temperature between 98.6° F. and 99.8° F. Repeated examinations of the urine gave similar results to those already noted. In about a week the animal was so weak that she was unable to rise, and ceased to feed, and on the following morning was found dead.

Post-mortem Examination.—A post-mortem examination was carried out the same day. There was very little fat in the body. The connective tissue, especially of the limbs, was dropsical. The peritoneal cavity contained some clear yellow fluid, estimated at about two quarts. The liver was soft, yellowish and fatty, and the margins were very dark. The spleen was normal. A small aneurism was found at the origin of the direct and indirect colic arteries and two smaller ones in the course of the former artery. In the aneurisms a few specimens of the *Strongylus vulgaris* were identified. In the ileum of the small intestines a small abscess about the size of a hazelnut was found under the peritoneum and five smaller ones under the mucous membrane near the pelvic flexure of the double colon, each with a small dark point at its summit. The purulent contents of these were thick and yellow. There were no worms present in them, but colon bacilli were identified in the pus. The lungs showed no macroscopic change. The pericardium contained about one quart of dropsical fluid. The heart weighed 11 lbs. 3 ozs., the right ventricle was dilated, and one of the cusps of the tricuspid valve was closely adherent to the septum.

The Kidneys.—The right kidney was enormously enlarged and weighed 5 lbs. 4½ ozs., and a division into lobes was imperfectly marked on its surface. The left kidney weighed 1 lb. 1 oz. The venæ stellulæ were deeply congested. In both kidneys the capsule was closely adherent and difficult to strip off. The consistence of the kidneys was firm, and on section the cortex was streaky grey and the medulla and boundary zone distinctly congested. The pelvis of the kidney was filled with mucus. The mucous membrane of the urinary bladder was deep red in patches, and was dotted over with numerous patechiæ. Sections were prepared from both kidneys.

Microscopic Examination.—On microscopic examination of these sections the capsule was found to be thickened and its fibrous tissue continuous with that of the cortex. In sections of the left kidney the glomeruli of the cortex appeared to be extremely numerous, probably as the result of contraction of the inflammatory fibrous tissue. These glomeruli presented profound changes. They were being converted into solid, shrunken, almost bloodless cellular masses filling only a small portion of Bowman's capsules, the lumina of which were in a few instances filled with albuminous material. These capsules were surrounded by one or several concentric layers of white fibrous tissue. Near the surface of the kidney some of the capsules were represented by large rounded spaces, the glomeruli having disappeared, and these spaces were filled with some homogeneous albuminous material which, on staining, was slightly tinted with eosin. At some points in the cortex the glomeruli had become fixed throughout to the outer walls of Bowman's capsule, and solid, partly cellular, masses were left which were continuous with the surrounding connective tissue. The uriniferous tubules in the cortex had, in greater part, disappeared and their place taken by new connective tissue. Only here and there could one identify isolated sections of convoluted tubules. Those of the straight tubules which were left were represented for the most part by

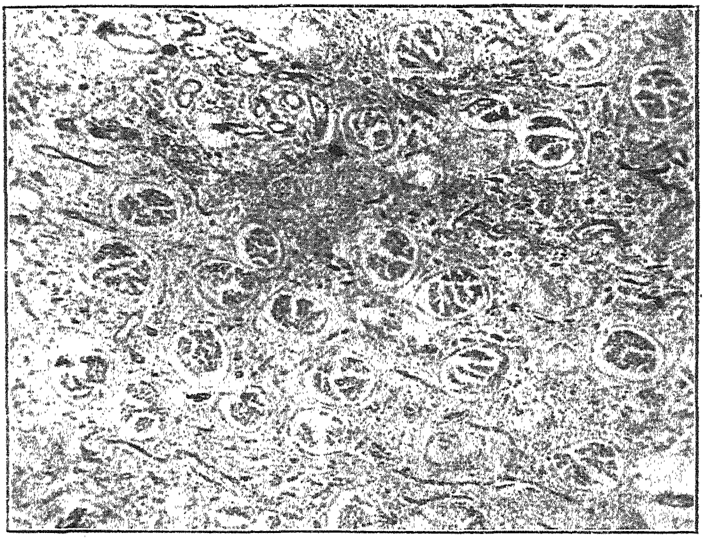


Fig. 1.—Cortex Left Kidney, showing the changes in the Glomerulia and the large amount of New Fibrous Tissues.

thin solid strands, composed of two layers of a low columnar or flattened epithelium. Many of these epithelial cells were impregnated with brown pigment granules. The new connective tissue of which the cortex was largely composed was loosely and irregularly arranged, and here and there in it could be observed accumulations of fibroblast and round cells. In the boundary zone and medulla the blood vessels were distended with blood, and at places hæmorrhage had taken place into the spaces of the connective tissue and the uriniferous tubules. Some of the tubules in the boundary zone were very much dilated, and even converted into small cysts with albuminous contents. This dilatation was noticeable, but not to the same extent, in the medulla, and some of the tubules contained albumen and a few *leucocytes*. The tubules in the boundary zone and medulla had not disappeared to anything like the extent noted in the cortex. In sections of the right kidney the glomeruli were not nearly so numerous as in the sections of the left kidney, only one or two being seen in a field with a magnification of about 50. The same changes, however, were noted in these bodies, and Bowman's capsule, but the latter appeared to be enlarged. In the right kidney there was not nearly so much fibrous tissue, and that which was present was largely distributed around the Bowman's capsules. The most striking feature of the sections of the cortex was the enormous calibre of the uriniferous tubules, particularly the convoluted tubules. A few of them contained one or two calcium

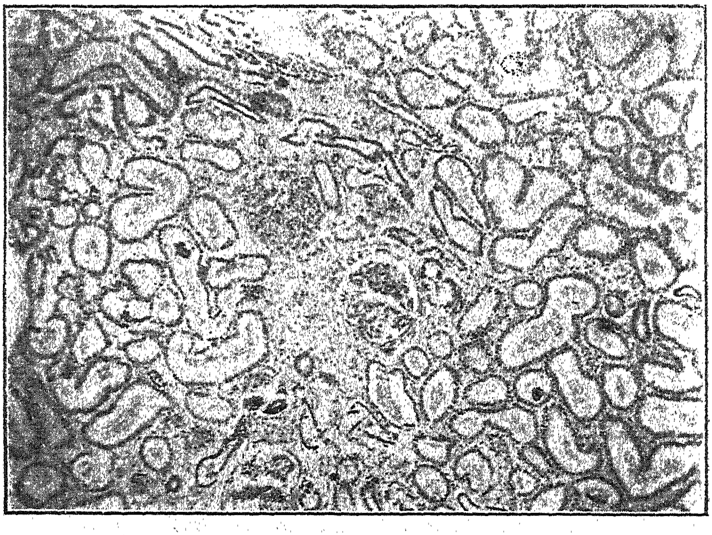


Fig. 2.—Cortex Right Kidney, showing the changes in two Glomeruli and the enlargement of the Uriniferous Tubules.

carbonate crystals, and some were filled with albuminous material. In the boundary zone and medulla the changes were similar to those noted in the left kidney, save that no cysts were noted in the boundary zone. Neither in films nor sections nor by attempted cultivation were organisms identified in the lesions. One might, therefore, suppose that the nephritis was toxic in origin, and it is quite possible that the toxins which caused the nephritic changes were manufactured in the abscesses in the bowel wall, and that the abscesses were set up as a sequel to invasion by *Strongyles*. From comparison of the lesions in both kidneys it appears probable that, since the changes were more profound in the left kidney, this organ was first affected, and the enlargement of the right kidney with hypertrophy of the tubules was an inadequate attempt at compensation. If the above explanation is correct regarding the development of the disease it would appear justifiable to conclude that the glomeruli and Bowman's capsules were primarily affected, and the condition would then be correctly termed a glomerulo-nephritis.

CASE II.—CHRONIC PURULENT NEPHRITIS.

This case was observed in a three-year-old bay half-bred gelding.

History.—The animal had been out at pasture for some time on the Dublin mountains, and nothing had been noted amiss until a few days prior to the date of admission to hospital. Then the chief symptom observed was a large subcutaneous swelling under the abdomen.

Symptoms.—On first examination the gelding was very fat, and the swelling under the abdomen was pronounced, particularly at the sides, extending forwards from the lateral aspect of the prepuce as far as the point of the elbow. The sheath was also swollen. The swelling was œdematous, pitted on pressure, was not painful, and not sharply circumscribed. The hind limbs above the hocks were also slightly œdematous. The visible mucous membranes were pallid, the pulse 78 per minute, small and thready, the respirations 18 per minute, and the temperature 101.6° F. On auscultation over the chest the lung and heart sounds were observed on each side in the lower portion. The fæces were examined for *Strongyles*, and eggs of these parasites found in moderate numbers. The fæces were distinctly yellow, and covered with mucus.

A definite diagnosis was not made at this time, but heart and general tonic medicine was prescribed.

In the course of a few days the animal was observed to become very weak. It staggered in its gait, lay down a great deal, and frequently ground its teeth. Its appetite was poor, it would take green food and hay, but refused mashes, and it ate oats very sparingly.

The œdematous swellings under the abdomen decreased, but those on the hind limbs became more extensive and larger. The pulse varied from 60 to 84, the respirations from 18 to 40, and the temperature from 99.8° to 101.8° F. On rectal examination no abnormality and no marked sensitiveness could be found in the kidney or spleen or other abdominal organs which came within reach. A sample of urine was drawn off and examined. It was distinctly yellow but clear, specific gravity 1,024, slightly acid in reaction. It gave no reaction to Fehling's test, but a hazy white ring with Heller's test. The percentage of albumen in urine estimated in the albumenometer with Esbach's reagent was .05 per cent. No casts or cells were observed in films of the deposit thrown down after centrifugalisation, and only an occasional organism was found which was thought to be accidental. A diagnosis was, therefore, made of nephritis, accompanied by dropsy of the tissues and cavities. Tonics, including Ferri Carb. and Digitalis were continued, and salicylic compounds varied with iodine preparations were administered daily, an occasional laxative being given.

Further Course.—The animal continued to lose condition rapidly, and remained very dull, often standing with the head depressed and with a haggard expression. It often lay down flat on its side, and then made a slight grunt with each expiration. The swelling under the abdomen became less marked, but those on the hind limbs became much more prominent, and a large swelling developed under the sternum between the fore limbs. A large serous cyst formed on each of the buttocks from leaning against the manger. In subsequent examination of the urine, this excretion was often alkaline, sometimes opaque, from the presence of oxalates and carbonates of lime, and the albumen varied in amount from ¼ to ½ gram per litre of urine. At no time were renal casts, nor was any appreciable number of cells found in the urine.

In blood films there was some evidence of anæmia, *poikylocytosis* and *anisocytosis* being chiefly noted.

As the urine passed became excessive in quantity digitalis was withdrawn from administration. After a time the animal had to be assisted to rise and had to be kept in slings. A very strong urinous odour was later given off from the skin, and the flanks and sides were often wet with urine.

The condition of the animal became very poor, although there were often variations in its general state.

In forty-four days after its admission to hospital the gelding died.

Post-mortem Examination.—A post-mortem examination was made the following day. There was very little fat in the body, its place being taken by a yellow gelatinous material. The subcutaneous connective tissue of the abdomen and chest were thickened, and œdematous. A large abscess about the size of an apple was found under the skin below the sternum. There was some dropsical fluid in all the serous cavities. The liver was yellowish and friable. The spleen showed no obvious abnormality. The lungs presented some slight hypostatic congestion. The heart muscle had a macerated appearance and the right ventricle was dilated. A large plasma clot was found filling up the ventricle and auricle of each side. Two sternal ribs (seventh and eighth) of the off side were fractured near the lower extremity, and at the fracture there was a slight callus formation.

A verminous aneurism about the size of a walnut was noted at the root of the anterior mesenteric artery, in which a few specimens of *Strongylus vulgaris* were located. The mucous membrane of the cæcum and also of the first and, to some extent, the third portion of the double colon was invaded by numerous small larval *strongyles*. Several species of adult *strongyles* were free in the lumen, including *Strongylus edentatus* and *vulgaris*. A few bots were attached to the cuticular portion of the stomach.

The important lesions were found in the kidneys. The kidneys were enormously increased in size and weight. The left kidney

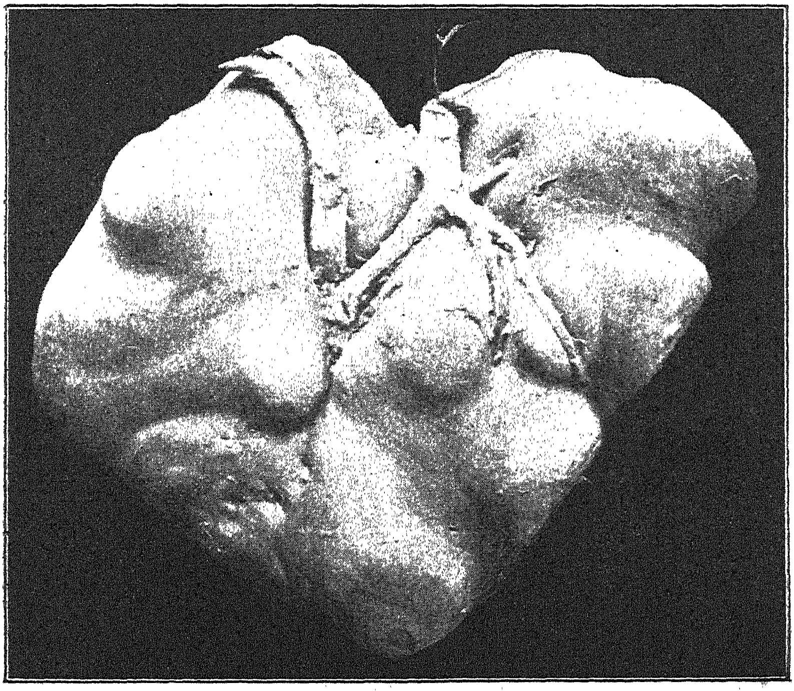


Fig. 3.—Left Kidney. Ventral Surface.

weighed 4 lbs. 10 ozs. and the right kidney 4 lbs. 4 ozs. In both cases large round knobs, like the broad ends of pullets' eggs in size and shape, projected on the surface. They were yellowish white in colour, and were moderately soft in consistence. In the left kidney there were twenty-one and in the right eighteen of these projections. The capsule of the kidneys was thickened and closely attached to the surface of the swellings, but elsewhere was easily removed.

On horizontal section of each kidney it was found that the projections were conical in shape and the narrow end extended into the substance of the kidney as far as the medulla. The cortex was chiefly involved and the bodies were yellowish white and soft throughout. Between these bodies there was no obvious change observed in the kidney substance.

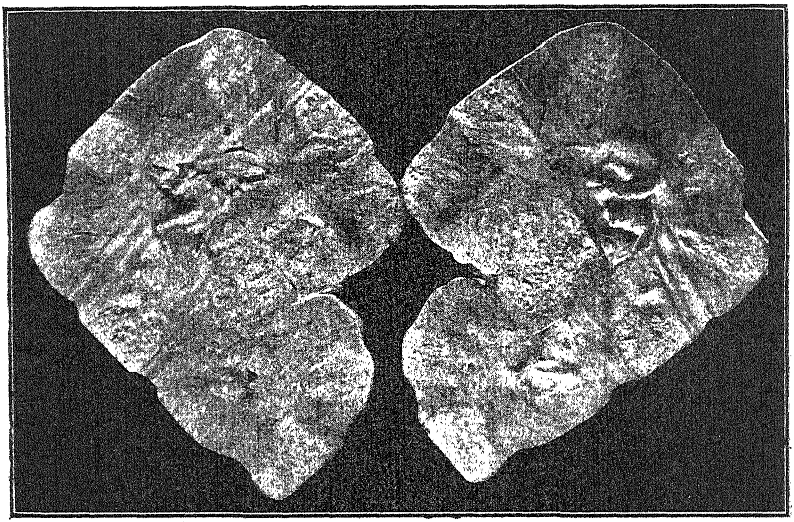


Fig. 4.—Left Kidney. Horizontal Section.

Films from the soft material in the swelling contained numerous *polymorphonuclear leucocytes*, a few round cells and Gram positive *staphylococci*.

Cultures of *staphylococci* were isolated from the lesions and grown on agar, serum and potato. The growths were identical with those of the *staphylococcus pyogenes aureus*. A rabbit was inoculated subcutaneously from the lesions, but beyond the formation of a small local abscess no other symptom developed. The abscess increased in size to that of a pea, did not rupture, and in two months' time its contents were quite sterile.

Sections were prepared from the lesions in the kidney, and also from what appeared to be normal kidney substance. In the latter case no distinct change in the histology of the kidney was discovered. In the lesions the uriniferous tubules had largely disappeared and were replaced by numerous abscesses of varying size and shape. The abscesses were formed of masses of *polymorphonuclear leucocytes*, and in their centre were numerous Gram positive *staphylococci* in large numbers, sometimes massed together. Many of the surrounding *leucocytes* were undergoing necrosis. There were hints at places of the formation of the pus centres in the Malpighian bodies, and in some cases the pus appeared to have accumulated in the course of the uriniferous tubules. The abscesses were separated from one another by varying amounts of young fibrous tissue in which plasma cells were often found in clumps or lines.

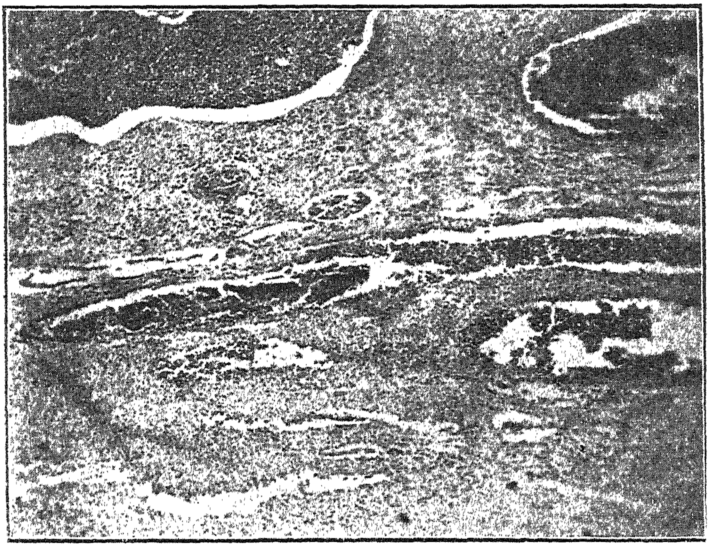


Fig. 5.—Cortex Kidney. Showing the Small Abscesses separated by Strands of New Fibrous Tissue.

In the granulation tissue long bundles of fibres were scarce, the white fibres formed a loose network, and this tissue was permeated with *leucocytes*. The lesions were separated from the normal kidney tissue by inflammatory fibrous tissue, and here the blood vessels were congested.

In examination of the renal artery no evidence of large emboli could be found to account for the localised nature of the lesions. The source of infection of the kidneys is difficult to ascertain. Two sources might be suspected, namely, the subcutaneous abscess under the sternum and the worm infection of the bowel. Of these two, the latter source is the most probable.

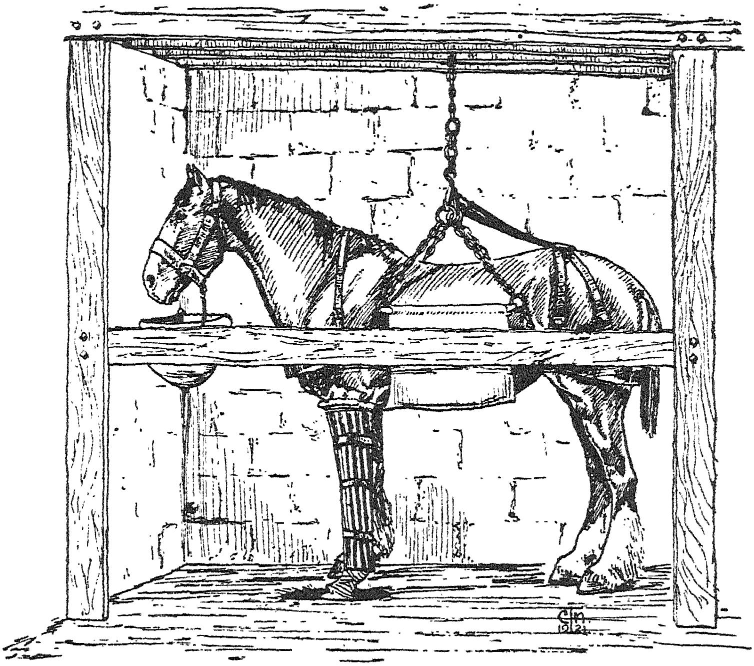
The subcutaneous abscess at the sternum did not develop till the later stages of the affection, whereas albumen was discovered in the urine at an early stage in the course of the disease.

FRACTURE OF THE RADIUS IN A CLYDESDALE MARE.

By DAVID IMRIE, M.R.C.V.S.
(Professor of Surgery, The Veterinary College, Glasgow).

THE patient, a thirteen years old Clydesdale brood mare, had the left radius fractured, the result of a kick in July of last year.

The fracture was a simple transverse one close to the knee, a most difficult one to treat successfully. The owner was anxious to save his animal and readily consented to treatment being adopted. The mare was put in a narrow stall erected for the purpose in the corner of a roomy loose-box which had earth for the floor, and placed in slings. When seen next day she was apparently suffering greatly, the pain of the fracture being much aggravated by the almost continuous movement of the leg. It was decided to postpone putting the limb in splints or plaster as it was considered that owing to the condition of the limb a satisfactory operation could not be carried out without first placing the animal under a general anaesthetic—a proceeding to which there were decided objections ; and in the meantime to make an attempt to induce or cause extension of the limb. In order to carry out the latter idea a plan was formulated whereby it was thought that weight might be exerted on the affected leg. The first step in the execution of this plan was the removal to a depth of about five inches of that part of the ground on which the foot of the injured leg might at any time rest. A certain measure of relief seemed to be obtained right away from the altered position of the limb which now merely touched the ground. Next day the severity of the pain had abated considerably. Further operations in the development of the plan were suspended and ultimately abandoned as being unnecessary, for every day saw a further slight improvement in the general condition of the animal. After a few days it would have been an easy matter to have put the limb in splints or plaster, the limb being now extended, the muscles relaxed and the approximation of the ends of the divided bone an easy possibility. But for reasons which need not be stated, but which had nothing to do with the treatment, nothing further was done for another week. The leg was then encased in a thick coating of plaster of Paris which reached from the elbow to the coronet. During the operation the mare behaved admirably—the actual operation presenting no difficulties. As soon as it was completed, however, she moved the limb rather vigorously in an attempt to get rid of the plaster with the result that the casing behind the knee was broken. An improvised splint in the shape of a broad piece



of tin placed round the limb at the knee and effectively kept in position by stack rope wound round it prevented further damage and made good the deficiency. On the following day the tin splint was replaced by one fashioned from the travelling canvas of a self binder. This was cut to the desired length and width, had the wooden ribs or spars reinforced by the addition to their number of others placed between those already existing. Three straps fitted with buckles were nailed to the spars—one near the elbow, one at the knee and the other at the fetlock. The new splint was easily adjusted to the limb and, once on, was not taken off for ten weeks, when it was removed for good, as was also the plaster. The mare was kept in the slings for another two weeks, when she was allowed her freedom in the large loose-box.

She is now, and has been for a long time, going practically sound and fit for work, but has been spared as she was known to be in foal. She has since foaled and the very slight deformity is of no account and was probably caused when the mare tried to get rid of the plaster casing.

The new splint completely embraced the plaster casing and therefore did not stop at the fetlock as depicted in the sketch. Mr. Carl Murphy to whom the writer is indebted for both drawings, had not seen this case, hence the mistake.

IRRITATING MEDICINAL AGENTS IN THE AIR PASSAGES OF THE HORSE—TREATMENT BY SALINE SOLUTION AND FORMALIN.

By W. W. LANG, M.R.C.V.S.
(*Brigg, Lincs.*)

Case 1.—Clydesdale gelding. Hurriedly called out as this animal was said to be seriously ill. He had a swelling inside the thigh, and the owner had given a physic ball and a drench which had "cured a case when all the vets. had failed." The animal was found coughing badly, salivating profusely, with accelerated respirations and a temperature of 105° F. Examination of the mouth revealed the mucous membrane of the tongue hanging in tatters—highly reminiscent of the chloral hydrate ball of war time notoriety; while auscultation of the pectoral region revealed strong churning sounds in the trachea. The drench smelt strongly of liq. ammon. fort.

On the fifth day the temperature had become normal, and recovery thereafter was uninterrupted.

The patient received daily sodium chloride ℔. ss., formaldehyde 40 per cent. i, aqua gall. iv., per stomach tube.

Case 2.—Shire horse had been drenched with a colic draught. Commenced coughing, discharging froth from the nostrils and salivating to such an extent that an urgent S.O.S. was sent over the telephone.

Found the patient settled down somewhat, but very disinclined to move, and grunting on the least exertion; his chest appeared to be very painful; breathing accelerated; pulse 80; temperature 104° F.

Administered treatment as above. Following morning patient bright and active; slight cough, but otherwise quite well. Attended for three days watching for pneumonia and gangrene, but these did not eventuate.

Case 3.—Thoroughbred in training. Choked after a gallop and was given a pint of water by the groom; coughed badly; owner then appeared and attempted to administer linseed oil, with the result that the coughing was more distressing than ever, and some of the oil was returned through the nostrils.

Found the animal to all intents and purposes in a dying condition, pulseless, membranes blanched and cyanosed, quick catchy respirations, haggard expression. Shook the mercury in the thermometer down to normal, but he did not move it; regretted afterwards that the mercury had not been shaken well below normal, as it is now believed that the temperature was subnormal. Prognosis, very grave.

Gave the now usual treatment, supplementing it by Liq. Strych. subcutaneously to give the heart a stimulus. In one hour and a half the pulse, 80, could be felt, and the temperature was 102° F., but otherwise the case still appeared to be serious. In another $3\frac{1}{2}$ hours there was a decided improvement; pulse 56, temp. 103° F., and inclined to eat.

Following morning, 12 hours later, the patient was quite well again. He appears to have sustained no ill-effects whatever, and has since won a race.

Case 4.—Choked with linseed oil administered during an attack of colic. Symptoms as usual, a temperature and accelerated breathing for two days, then recovery. Treatment as above.

Case 5.—Similar to No. 4, but quite well again in 12 hours.

Case 6.—Also choked by linseed oil, and apparently all right in two days, but four days later was found with a temperature of 108.4° F., pulse 96, and accelerated respirations. On the following morning, about 12 hours later, the temperature was 105° F.; 24 hours after that; temperature 101° F.; on the following day temperature normal. During this later illness treatment was administered only three times ; nothing was given on the last visit.

It is admitted that such happy results were, to say the least, unexpected, though welcome. Treatment was based on the anodyne and preservative action of saline—it is excreted through mucous membranes—while in Case 3 it appeared to counteract shock in a very satisfactory manner. Formalin was administered with a view to preventing pulmonary gangrene—an action claimed on its behalf by Professor Imrie.

TRANSVERSE FRACTURE OF OS PEDIS.

By Captain W. WALLACE KERR, M.R.C.V.S.
(*Saffron Walden*).

Subject.—A six-year old half Suffolk and Shire gelding. Weight about 16 cwt.

History.—The horse came home off work (ploughing) absolutely walking sound, was fed and turned into large yard, which was covered with straw. Next morning the horse was lame on off hind and in great pain, and could not put any weight on foot.

Symptoms.—Appeared to point to a punctured sole and with pus, or to some foreign body having penetrated and lodged in the foot. There was no heat present in the foot either in sole or wall, and there was no swelling of the coronet or affected leg. Yet the horse was in agonising pain.

Examination.—The shoe was removed, the sole and wall were percussed by hammer, and pressure exerted with pincers, and pain was evinced in region of the sole near the inside bar. A small exploration puncture was made, but only blood exuded.

Treatment.—Hot bran poultices were applied morning and night for three days, physic ball administered, but no improvement. Blisters were applied to the coronet and the foot bandaged in tow, with oily compresses on sole for about two weeks. Still no improvement. The sole was again explored and a separation was found beginning between horny and sensitive soles. This was removed carefully, but still no evidence of pus.

Diagnosis.—At the onset the lameness might be due to several causes, such as: (1) Punctured sole; (2) pus in the foot; (3) injury in nailing of shoe; (4) acute laminitis; (5) rupture of flexors at their insertion; (6) fracture of navicular bone, os corona or os pedis. Fracture of the os pedis was arrived at from the onset, but the cause of the fracture was the mystery.

Suggested Cause.—The horse was a young and light-hearted animal, and in play when loose overnight in the yard may have bucked and violently kicked out with his leg and struck a wall or post with such terrific force that the pedal bone was fractured.

Prognosis.—Most unfavourable after all the usual remedies had been employed, and no improvement resulting. Treatment was maintained for some weeks, and owner would not consent to any further removal of the sole and decided to let the horse take his chance. Occasional visits were made, the horse still in pain, and no improvement, and the foot showed symptoms of descent of the pedal bone, as through the exploration hole in the sole the pedal bone could be seen to move when the foot was turned and swayed from side to side. The owner would not consent to a further removal of the sole even at this stage, as he was still hopeful of recovery, thinking, as the horse was young, healthy and strong, that "Nature" would do the rest. Three months elapsed from the onset of lameness to the time when owner consented to a full exploration of the foot. This was done, and on the removal of the sole nearly the whole of the os pedis fell on the ground, a huge cavity was left, and the sensitive sole could be seen receded well up the inside of the wall as the result of no pressure having been exerted on the foot. The horse was slaughtered, the foot boiled, and the bones preserved.

Remarks.—Interest surrounds this case, firstly in the fact that there was no history of injury, strain or any known reason how the bone could have been fractured. Secondly, on account of the attitude of the owner being unwilling to consent to prompt exploration of the foot at the onset. Thirdly, in the resultant specimens showing the altered position of the attacked portion of the os pedis, the angle of the digital bones when in situ, and the exudate and attempt at reorganisation.

PERICARDITIS CAUSED BY A BROOM BRISTLE.

By W. WALLIS, M.R.C.V.S.
(*Barnet*).

The patient was a cow with tympanitis, stated by a client to have been taken suddenly ill. When I arrived I found definite and distinct heart symptoms, characteristic of the presence of a foreign body in the pericardium. There was tympanitis, but auscultation revealed the tinkling sounds which made me suspect heart mischief, and as the beast was in good condition I advised slaughter for food purposes.

Post-mortem examination revealed the presence of an ordinary stiff bass broom bristle, 3½ inches long, which had threaded its way through the pericardium and embedded itself in the cardiac muscle. Its passage could be distinctly traced from the reticulum, through the diaphragm, and so into the pericardium (which was enormously thickened) to the heart itself. What astonished me at the time was that a bristle should have had such penetrating power.

OBSERVATIONS ON AN OUTBREAK OF RABIES IN THE OLD BERKSHIRE KENNELS IN 1885.

By R. J. VERNEY, M.R.C.V.S.
(*Oxford*).

During the second week of April a hound named "Shamrock" was noticed to be unwell and developed rabies in the dumb form, dying about the 18th, after being under observation for four days. About May 16 "Vampire" was noticed to be ill, and had rabies in its worst form, gnawing the woodwork and bricks and tearing the zinc plating off kennel door. This animal was killed as soon as the Master could be communicated with. The huntsman was of opinion that the disease was contracted in the Faringdon country during the last month of the season, there having been some cases of madness in dogs reported from that neighbourhood, but I hear that the hound "Vampire" which was walked in that district was in the habit of going back home and when missed was sent for next morning, and he may have been the source of the infection to the pack, although "Shamrock" was the first hound noticed to be affected. He may have been bitten by a dog when out hunting, and probably "Vampire" was also bitten during one of his excursions home. About a week or ten days after "Vampire's" death three cases occurred in one week, all assuming the dumb form. No other case occurred for a fortnight, but during the third week another, "Bessborough," became affected with dumb madness. This would be about June 12. In the second week of July, one month after "Bessborough's" death, "Affluent" became a victim, also showing the dumb form, and was killed on July 11.

July 12.—Three and a half couple were in hospital for isolation, having been bitten in a kennel row the day before " Affluent " showed symptoms of the disease. Their wounds had been duly cauterised. I noticed they all looked well.

July 16.—Two cases occurred amongst the pack, not in the three and a half couples under isolation.

Case 1, " *Document*."—The hound I had noticed on Sunday was first noticed unwell at feeding trough on Monday morning and at once isolated. Acute symptoms, no paralysis ; was lying on the bedstead ; came at once to the gate on being called by the huntsman, and was quite inclined to fondle with him through the bars, and, although he had a far-off expression about his eyes, seemed to listen to familiar sounds and looked quite pleased to see the whipper-in come in at the yard gate. He took hold of a crop when presented to him, and kept on biting the bars of the gate, but had no paroxysmal rage. I noticed the brownish coffee colour of his tongue, which was well marked. Saliva flowed copiously when he took hold of the bars. No protrusion of membrana nictitans, and no extraordinary symptoms, except the far-off look in his eyes, and his continual listening attitude. On getting off the bedstead he passed urine without putting up his leg, and very carefully licked it all up, showing a depraved appetite, and I thought from his manner evidence of sexual desire, a condition the huntsman had noticed in most cases at their commencement.

As the huntsman had the impression (very prevalent) that there was a dread of water, I demonstrated the fallacy of that idea to him. *A bucketful of water was placed against the bars outside the gate of which he took no sort of notice, but on the other hand did not draw back from it. It was then put inside the gate, and for a few seconds the dog did not take any notice of it, but after that he drank freely and without any noticeable trouble, neither did it excite any further rage.* He still kept on biting the bars, and stood looking intently at us, evidently recognising the huntsman and the whipper-in.

Case 2, " *Blueman*."—Well-marked case of dumb rabies and pitiable to look at indeed. He was tied up by a collar and chain, and stood all in a heap when the door was opened, moved as soon as we entered, and recognised the huntsman. When spoken to he came the length of chain towards him and tried to pick up a piece of biscuit, but this he was unable to accomplish. His lower jaw was hanging down quite loose, and his mouth and tongue were quite dry. The membrana nictitans was half over the eye and very red. All the muscles of his shoulders and back were rigidly contracted, and this extended to the tail, which was raised at the root in a ring-like curve, cocked, as we would term it in a horse with tetanus, but was firmly curled between his legs. His breathing was difficult, and he also slightly moaned. When he tried to cry his voice seemed lost in hoarseness. He was very restless, but it was of an idiotic character, purposeless, giving me the idea that he would have gone out had he been loosed and then wandered aimlessly about.

"Blueman" was subject to kennel lameness, affecting his back, and when first amiss was thought to be affected by this, and stimulating embrocation applied. Other symptoms, however, followed, which clearly demonstrated the nature of disease.

The body of the pack, with which the three and a half couple before isolated had now been replaced, were let out for exercise in the grass yard, and the huntsman at once picked out "Victor," who was at once drawn and isolated. He had fed well and looked full, and presented no other than ordinary symptoms of health except, perhaps, looking a trifle dull. The huntsman informed me he had noticed him go round and round a tree and then come back and smell the same place again and again, displaying to him more or less mental aberration not noticeable to a stranger.

July 17.—"Blueman" still alive, but much more paralysed and unable to stand. "Document" still alive and his symptoms much the same. Tendency to bite just as strong, snapping at a hunting crop when presented to him and biting the bars. No symptom of paralysis about legs or body, but when standing in the before-noticed listening attitude his lower jaw dropped a little. *He still drank quite freely and without any difficulty from the bucket which had been placed in his kennel yesterday, and which was now partly empty.* After our entrance he got off the bedstead and stood intently watching us, recognising the huntsman without a doubt, especially when spoken to.

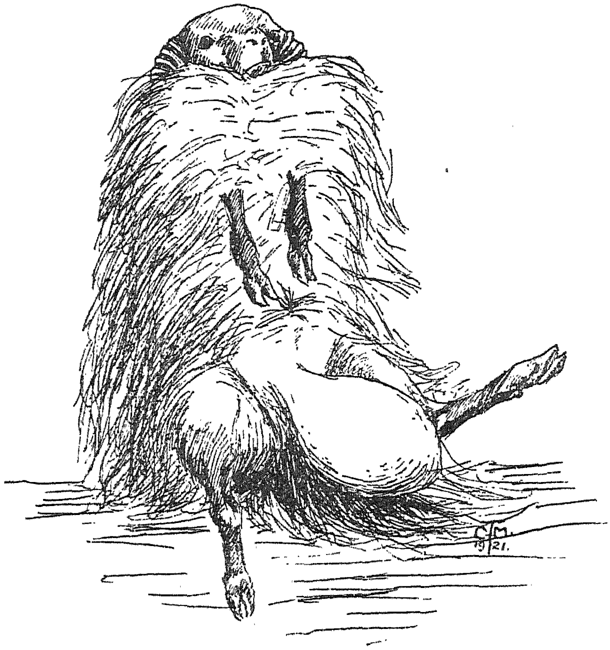
"Victor," the hound isolated yesterday morning, had developed further symptoms, which commenced by general dullness and slight stiffness in his left shoulder. He was lying on the bedstead, and when called sat up with some difficulty, hesitating to come down. Seemed quite sensible, and after getting down from the bedstead even wagged his tail and put himself up against the bars to be caressed. The membrana nictitans was protruded, and paralysis of limbs and back most marked. He reeled about in his walk, and very unsteadily got back to his bedstead, to get on which he had much difficulty. He then sat down and held his left fore limb up from the floor, as if in pain. He took food readily in the morning, and seemed to have no disposition to bite whatever. Both these hounds died.

A lot of hounds were lost, and the next season the pack was made up with gifts of couples from here and there.

RADICAL CURE PERFORMED FOR SCROTAL HERNIA IN A TUP HOG.

By DAVID IMRIE, M.R.C.V.S.
(Professor of Surgery, The Veterinary College, Glasgow).

THE patient, a highly-bred black-faced tup hog of great value, had a right-sided congenital scrotal hernia. When first consulted about it the hernia was of considerable size, but in the interval before operation—a matter of a few weeks—it had increased in dimensions greatly, assuming enormous proportions, and reaching, when the animal was standing, almost to the ground. It was reducible, and the external ring on that side was very large, as felt by digital examination.



Operation.—The abdominal wall, scrotum and thigh were shaved and thoroughly cleansed the day before operation with soap and water, turpentine and spirit. The tup received three drams of chloral hydrate in solution with water by the mouth, and after the lapse of twenty minutes was placed on the table and secured in the dorsal position. The large hernia was now reduced, but before this could be accomplished it was found necessary to raise the hind parts by elevating this end of the table. The part prepared was painted with tincture of iodine, and an incision two inches long was made over the external abdominal ring and nearly parallel with Poupart's ligament. The incision was deepened until the sac was reached. This was picked up incised, and some omentum and bowel returned to abdominal cavity. The sac was, by blunt dissection, separated from the surrounding tissues. The cord elements were looked for, found, and separated, also by blunt dissection, down to the testicle. The sac was of the congenital type—a patent *processus vaginalis.* It was cut through in the middle of its length and the lower half, after being detached from the testicle—the latter being inside—was removed.

Treatment of Remaining Half of Sac.—The lower opening of sac was closed by purse string suture of stout catgut. The same suture was used and was passed through the sac a few times until the internal abdominal ring was reached. This was done by first passing the needle through from front to back and then from back to front of the sac. The curved needle was now replaced by a hernia needle, which was passed along the short, wide inguinal canal—it was very wide and only about half an inch long—and into the abdominal cavity, and then out through the abdominal wall about one inch internal to internal abdominal ring. The hernia needle was removed and the suture pulled tight. The result was, the sac was puckered up and placed in contact with the abdominal wall internally. This position was secured by using a curved needle and anchoring the sac by a few stitches to the abdominal wall.

There was still the weakness of the part to treat, as the wide canal was only half an inch long, and went practically straight back from the large external abdominal ring to the abdominal cavity. Two mattress sutures were employed. The hernia needle, threaded again with stout catgut, was passed into the abdominal cavity and out first on one side and then on the other side of the canal. This was repeated a little lower down ; that is, nearer the scrotum. The sutures were pulled tight and tied. The result was that the space which was an open invitation to the bowel to come down again was closed, there being left only sufficient room for the cord to pass down comfortably without its being subjected to pressure.

The skin and subcutaneous tissues were closed by interrupted silkworm gut sutures and a pad of sterile gauze applied to the part and kept in position by adhesive plaster and a bandage.

After two weeks the wound was examined, found to be clean, and treated as before. On the sixteenth day the skin sutures were removed and the wound found to be completely healed.

A considerable swelling occurred in the scrotum a day or two after operation. It was boggy in nature, not painful, and, gradually subsiding, had almost completely disappeared in three weeks.

The small skin wound was only to be seen if searched for, and now, six weeks after the operation, the scrotum appears quite normal. It may be stated that the anæsthesia was perfect. The patient never moved during the operation, which occupied fully an hour, and did not at any time appear to suffer any ill-effects from the operation.

ORCHITIS IN THE DOG.

By G. MAYALL, M.R.C.V.S.
(*Bolton*).

An Airedale-terrier dog, "Jack," the property of a cotton mill watchman, was brought to me on April 27 with his testicles and posterior portion of the penis greatly swollen. He had jumped some high iron palings surrounding the mill and caught his testicles on the moderately blunt pointed ends of the railings when going over. The swollen organs measured in circumference, taken over the scrotal skin, 7¼ inches by 6¼ inches. There was no breach in the skin, but the parts were hot and painful, and especially tender at the front of the swelling, and the posterior portion of the penis and erectile enlargements were swollen. The testicles and scrotum were gently massaged with collosol iodine oil (Crookes'), 3 per cent., and a teaspoonful of colloidal iodine, 1 in 500 (Crookes'), was given three times daily by the mouth. On April 28 the swelling burst at the front and discharged a mixture of blood and serum. On the 30th the parts had declined in size and the scrotal wound was looking quite healthy and dry. It was dressed with dermatol, and the internal administration of the colloidal iodine continued three times daily. On this day the dog unloosed the snap of his chain and jumped a 4-ft. 6-in. half door into the yard. The testicles were almost normal in size on May 3, and on May 5 he was discharged, with some dry dressing to apply to the scrotal wound. I have treated one or two cases of orchitis in the dog, but never had one where the organs were so greatly swollen as in this one, or where the case progressed more rapidly to a favourable issue. Gentle exercise also aided in reducing the swollen organs.

ARSENICAL POISONING IN CHICKENS.

By MAJOR C. G. SAUNDERS, D.S.O., B.V.Sc., M.R.C.V.S.
(*Worthing*).

Owing to several deaths in a flock of chickens a dead bird was brought for post-mortem examination, but with very little history as to symptoms preceding death. The post-mortem revealed a slightly congested condition of the mucous membrane of the whole of the alimentary tract, but nothing typical. As I had had several cases of arsenical poisoning in cats and dogs, I tested the crop and intestinal contents for arsenic by Reinsch's test, obtaining a very typical reaction, and it was confirmed in the usual way.

Upon visiting the poultry pens it was found that all the deaths had occurred in a pen situated close to a hedge, upon the other side of which the neighbours had been burning an accumulation of weeds, which had been killed by the application of arsenical weed-killer. The smoke from the bonfire drifted over the hedge and over this particular pen. The owner was advised to remove all the fowls from that pen to another part of the premises. This was done, and no further deaths have occurred. In all, three post-mortems were made, none of which showed the typical lesions of arsenic poisoning, but I was able to demonstrate the presence of arsenic in each one of them.

ROSE CHAFER POISONING IN CHICKENS.

By B. A. GALLAGHER,
Washington, D.C.

EXTENSIVE losses among chickens, generally attributed to other causes, result from eating rose chafers which invade certain sections of the country during the latter part of May, June and early July. Several cases of rose chafer poisoning have recently been observed in young chickens submitted to the Pathological Laboratory of the Bureau of Animal Industry for examination. In these cases the losses reported ranged from 25 chickens in one flock to 85 in another. Reports of similar outbreaks, however, indicate that the mortality from this cause may run much higher, depending upon the number of birds exposed.

APPEARANCE, DISTRIBUTION, HABITS.

The rose chafer or "rose bug" (*Macrodactylus subspinosus*) is a light ochre or yellowish brown-coloured beetle about one-third of an inch in length, and has long, spine-covered legs. It is found in the area extending from Canada to Virginia, Tennessee and Oklahoma, and from the Atlantic Coast to Colorado. These beetles usually appear suddenly late in May or early in June in the southern part of their range and about two weeks later in northern regions. Their coming corresponds rather closely to the time of blossoming of various garden flowers. They disappear about a month or six weeks after their arrival. Some years rose chafers are much more abundant than in other years, and work great havoc on vegetation, especially on vineyards.

Nearly every form of vegetation is attacked, blossoms, leaves and fruit being consumed. The chafers feed on roses and other garden flowers, ornamental plants, shade trees, shrubbery, grapes and other garden fruits, many garden vegetables, corn, wheat and grasses, also on various weeds and wild plants.

LIFE HISTORY.

One generation of rose chafers is produced annually. The length of life of an individual is about three weeks, and during this time the male and female are almost constantly paired. The female deposits an average of 30 eggs from one-fourth of an inch to four inches below the surface of the ground, usually in sandy soil. The eggs are deposited singly in the walls of small burrows. Larvæ hatch in from two to three weeks, appearing as yellowish white grubs with brownish heads. These feed upon the roots of plants until late in autumn, when they burrow deeper in the ground below the frost line. In the following spring they return to near the surface and transform to pupæ. After two to four weeks the pupæ transform to beetles, which pass out of the soil, mate, and begin feeding on the surrounding vegetation.

SUSCEPTIBILITY OF CHICKENS.

Reports of outbreaks, and experiments carried out by Lamson, indicate that chickens over 10 weeks old are not killed by feeding on the insects, although symptoms of poisoning are sometimes produced. Lamson states that from 15 to 20 rose chafers are sufficient to cause the death of a chicken one week old; from 25 to 45 are necessary to kill a three weeks old chicken, and that 96 killed a 10 weeks old chicken. Apparently the poisonous effect of the insect varies, as autopsies conducted by the writer on chickens ranging from two to eight weeks old disclosed not over 10 rose chafers in the crop of any chick, and as few as two insects were found in the crop of an eight weeks old chick which died from this cause. When rose chafers are numerous, however, chickens will devour large numbers and the crop may be distended and present the appearance of "crop bound."

That deaths are due to the poisonous nature of the insects rather than to mechanical interference is proved by Lamson, who found that a filtered watery extract of crushed rose chafers fed to chickens produced death in the same manner as the insects. When injected into the veins of rabbits in 2.5 c.c. to 4 c.c. doses the extract caused death in from 55 seconds to six minutes. Lamson believes that the poisonous principle is a neuro-toxin which has an effect upon the heart action.

SYMPTOMS.

Symptoms may appear as early as one hour after feeding on the beetles. The affected bird becomes drowsy, shows weakness of the legs, and falls over on its side. There may be convulsive movements. Sharp cries are frequently emitted, and retraction of the head and neck over the back of the chicken is quite characteristic. Death occurs in the period up to 24 hours after eating rose chafers. In the outbreaks observed by the writer death followed in from half to one hour after symptoms were observed. If a sufficient amount of the poisonous principle to produce death is not absorbed the symptoms disappear.

POST-MORTEM APPEARANCE.

On autopsy the affected birds fail to show changes in appearance of the alimentary tract or other internal organs, other than an injection of the blood vessels of the heart wall in a minority of the cases. The only diagnostic clue presented is the presence of rose chafers in the crop. These appear darker in colour than when observed in the free state, owing to the action of the crop contents on the yellow pigment of their bodies.

TREATMENT.

The rapid action of the toxin renders treatment unsatisfactory in birds showing symptoms. An effort, however, may be made to reduce the mortality by administering a purgative to all exposed chickens of the flock as soon as the nature of the trouble is realised. Teaspoonful doses of castor oil containing 15 drops of turpentine would be indicated and may also be given to birds showing symptoms. In a large flock, however, individual treatment would be too slow and tedious, hence the use of Epsom salt would be advisable. This should be given in the proportion of one-fourth of a teaspoonful to each bird under 10 weeks old. The total amount of salt necessary is dissolved in water and mixed in the amount of mash which the flock will readily consume.

PREVENTION.

During the period when rose chafers are present young chickens may be kept in enclosed runs or at points where they will not have access to grape vines, rose bushes, shrubbery, vegetables and other flowering plants infested by the insects.

Arsenate of lead and Bordeaux mixture thoroughly sprayed on vines, bushes, etc., before the blossoms appear, and once or twice while the beetles are present, will do much to destroy the pest and prevent serious injury to plants and chickens.

The rose chafer while in the pupal stage may be readily destroyed by ploughing and harrowing infested soil during May in the southern range of the insects, and during the latter part of May and early June in their northern range.

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RECOGNITION OF THE WORK DONE BY THE ROYAL ARMY VETERINARY CORPS DURING THE GREAT WAR.

Decorations and Awards.

	Number Awarded.
K.C.B.	1
K.C.M.G.	3
C.B.	8
C.M.G.	21
C.B.E.	16
D.S.O.	53
O.B.E.	94
M.C.	49
M.B.E.	16
C.I.E.	2
To be Major-General	2
To be Brevet Colonel	2
To be Brevet Lieutenant-Colonel	20
To be Brevet Major	21
To be Brevet Colonel on promotion to Lieutenant-Colonel	1
To be Major	1
To be Honorary Captain	1
Next higher rate of pay	2
Order of the Nile, "Third Class"	2
Order of the Nile, "Fourth Class"	7
Croix de Guerre	11
Ordre du Merite Agricole, "Officier"	6
Ordre du Merite Agricole, "Chevalier"	18
Medaille d'Honneur avec Glaives, "En Vermeil"	2
Ordre de Leopold avec Croix de Guerre, "Officier"	1
Ordre de Leopold avec Croix de Guerre, "Chevalier"	1
Legion d'Honneur Croix d'Officier	1
La Medaille de la Reconnaissance Française, "Second Class"	1
La Medaille de la Reconnaissance Française, "Third Class"	2
Order of the Crown of Italy, "Officer"	1
Croce di Guerra (Italy)	1
Order of St. Maurice and St. Lazarus, "Cavalier" (Italy)	2
Order of the Redeemer, "Third Class" Commander	1
Military Order of Aviz, "Commander"	1
Military Order of Aviz, "Chevalier"	2
Order of El Nahda, "Fourth Class" (King of Hedjaz)	1
Greek Medal for Military Merit, "Second Class"	1
Order of the White Eagle, "Third Class," with Swords (Serbian)	1
Order of St. Anne, "Third Class," with Swords	1
Order of St. Stanislav, "Second Class," with Swords	3
Order of St. Stanislav, "Third Class," with Swords	1
Total	381

1,681 Officers served in the R.A.V.C. during the war, and the names of 551 appear in the despatches published in the London Gazettes. The total number of mentions in these despatches reached 857.

In addition some 40,000 warrant officers, non-commissioned officers and men served in the Corps. These received no fewer than 443 decorations and 518 were mentioned in despatches.

Sixty-two were killed in action and 449 died on active service.

Review.

THE EARLY STAGES OF THE TABANIDÆ (HORSE-FLIES). By WERNER MARCHAND, Ph.D. Monographs of the Rockfeller Institute for Medical Research No. 13, November 15, 1920.

THE object of this work of over 200 pages, with 15 plates, containing 186 figures, as explained by the author in the introduction, is primarily to collect all the known facts concerning the immature stages of this important group, which in this country are variously referred to as brimps, breeze flies, gad-flies and dun flies. Such a collection of facts on a definite subject concentrated in one publication cannot but be of the greatest value to workers in the field without facilities of consulting libraries. Even where this is possible the monograph forms a directory.

Although the Tabanidæ play a considerable part in the transmission of diseases of the domesticated animals, and in spite of the trouble which their presence in great numbers causes to horses and cattle under even normal conditions, our knowledge of their life histories is very incomplete compared with that which we possess of the other groups of blood sucking insects—for instance, the Culicidæ.

A chapter is devoted to the history of tabanid investigations, starting with those of de Geer in Sweden in 1760, down to the more numerous workers of the last twelve or fourteen years.

This is followed by a general description of the early stages of the family. Neaves' work on the bionomics of the tabanids in Nyasaland has shown that the majority brood only once a year. This is true of *Tabanus*, but certain species of *Chrysops* and *Hæmatopota* may be double brooded, this depending on the larval food supply and climate. Apparently in many cases the larva grows very slowly after hatching and takes six months to become full grown. It then, especially in *Tabanus*, goes through a resting period, being buried in sand or mud; then follows a short pupal period of 10 to 18 days. It would appear that larvæ which miss pupation may remain in the larval stage until the following year. Following this general account, the known early stages of the various species of *Chrysops*, *Tabanus*, *Hæmatopota* and other less important genera, are considered in detail. The family consists of more than 2,000 species and of these data of the early stages is known only in 91, and in a number of these it is very incomplete. A table is given showing the names of these 91 species, and their habitats together with columns for particulars concerning the eggs, larvæ and the habits of the larvæ. In the former two columns the names of authorities and the dates of their work are stated. Extracts from this table concerning some of our British species, show that there is no information available with regard to the egg of

Chrysops relictus. The same is true of *Hæmatopota pluvialis, Tabanus bovis, T. bromius* and *T. cordiger*, all the larvæ of which are terrestrial.

As one of the few completely known life cycles Neaves' work with *Tabanus corax* Lœw in Southern Nyasaland may be quoted. The eggs are deposited on reeds of grass overhanging mud in the bush. The egg mass is at first white, but hardens to a grey colour; the individual eggs are spindle shaped; hatching takes place in about five days, the shell splitting down the long axis. The larva drops into the mud or water below, and may bore to some depth to afterwards undergo pupation; the larvæ are ferociously cannibalistic.

An account of the parasites of the eggs and immature forms includes 3 *Phanurus* sp., 2 *Telenomus* sp., 3 *Chalcids* and 1 *Tchneumonid.*

A few useful notes on the methods of rearing and studying tabanids in their immature stages is given. The work concludes with an extensive bibliography. A. W. N. P.

RESEARCH SCHOLARSHIPS IN AGRICULTURAL AND VETERINARY SCIENCE.

The Ministry of Agriculture and Fisheries invites applications for Research Scholarships in Agricultural and Veterinary Science.

Applicants for these Scholarships must be nominated by a Professor or Lecturer of a University or College. Nominations must be received not later than July 15 next, and must be made on the prescribed form to be obtained from the Secretary, Ministry of Agriculture and Fisheries, 4, Whitehall Place, S.W.1.

The Scholarships are tenable for two years, and are of the value of £200 per annum. The number to be awarded in the present year will depend upon the qualifications of applicants, and will in any case not exceed five.

The Agricultural Scholarships are open to graduates with honours in Science of a British University who give evidence of high proficiency in subjects having a direct bearing on agriculture. The Veterinary Scholarships are open to students who have secured the diploma of the Royal College of Veterinary Surgeons.

(*Ministry of Agriculture and Fisheries.*)

Correction.

DEVELOPMENT COMMISSION.

In the list of members of the Advisory Committee on Research into Diseases of Animals, the name Sir John W. Frodyear, M.B., B.Sc., M.R.C.V.S., LL.D., should have read Sir John McFadyean, M.B., B.Sc., M.R.C.V.S., LL.D.

NOTICES.

All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C.2. Telephone: Gerrard 4646. Telegrams: "Baillière Rand, London."

Copy or advertisements should be in the hands of the publishers—Baillière, Tindall and Cox—not later than the 25th of the month, or if proof is required not later than 23rd.

THE

VETERINARY JOURNAL

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JULY, 1921.

Editorial.

THE NATIONAL VETERINARY ASSOCIATION.

THE fact, as published in a recent issue of *The Veterinary Record*, that up to the present only 824 members of the profession, out of a total of 3,320, have "joined up" does not say much for our *esprit de corps*, and that only about 60 per cent. take the trouble to read the weekly organ of the profession shows a lack of interest which is regrettable.

We are indeed slow to realise the value of acting up to our motto, "*Vis unita fortior*," and those who grumble most because our just rights are not given to us are, as a rule, those who have helped the least. If only every man would join the Association *and give it his whole-hearted support* we could, if we held together, get all our just dues. All public appointments connected with the inspection of animals, alive or dead, should be under our control; the salaries offered to our whole-time Government and other appointments should be on a scale which would be an adequate recompense for the services of educated and specially trained professional men: our colleges and teaching institutions should be adequately supported morally and financially; and all matters which we bring forward before Parliament or any Government body would have sufficient weight behind them to enforce serious consideration.

All these things can be brought about by proper and loyal combination, and the National Veterinary Association can, if only we support it whole-heartedly and with absolute loyalty, be converted from an effete and insignificant body, without union and without power, into a live and powerful organisation; able to dictate, and even to command, in the name of the profession, its rights and dues; second only to the Council of the Royal College, who would, on occasion, be only too glad to have such a powerful driving force at its back.

The profession, as a body, was ever apathetic; it is still much too apathetic; and those who have tried to raise its enthusiasm know this full well. The present Secretary has made superhuman efforts to make the Association what it should be, and *The Veterinary Record* a paper worthy of the profession, but a membership of only 824 out of a possible 3,320, and a subscribers' list to the weekly paper of only 1,803, shows a lack of intelligent interest which is lamentable, and which can only be remedied by our own selves.

RESEARCH SCHOLARSHIPS IN AGRICULTURAL AND VETERINARY SCIENCE.

Too much publicity cannot be given to any chances offered to our graduates for research work, and attention is again called to the announcement, published in our last issue, of the Ministry of Agriculture and Fisheries, who invite applications for Research Scholarships in Agricultural and Veterinary Science. These are to take the form of scholarships tenable for two years, and are each of the value of £200 per annum. The number awarded in the present year will not exceed five, and nominations must be sent in before July 15. The prescribed form can be obtained on application from the Secretary, Ministry of Agriculture and Fisheries, 4, Whitehall Place, S.W. The profession is very poor in chances of this kind, and, although at the present value of money the amount of the scholarships is not great, they afford opportunities to our young graduates which should be gripped with both hands, as being the foundation of future scientific edifices for the profession and for themselves. There are many of the older members of the profession who look back with retrospective ideas of what godsends such opportunities would have been in their younger days, and we shall be foolish if we do not take them now they have arrived.

THE OLD HORSE TRAFFIC.

ALTHOUGH the "decrepit" horse traffic is a thing of the past, and much has been done to ameliorate the condition of the animals sent over the Channel for butchery purposes, there are still many points which need the consideration of the Government, and which have given rise to an outburst of justifiable indignation on the part of the general public with a view to prohibiting the traffic altogether. It is not merely a question of sentimentality, and there are two points in particular on which we, as practical veterinarians, can absolutely join issue. One is the method of killing, and the other is the question of risk of injury on the voyage. The lover of horses does not mind his animals being killed, so long as this is done in the most humane manner possible, but the hammer and the knife are not always painless or instantaneous. One has not to wait long in a horse abattoir on the Continent, where either pithing or stabbing to the heart is the method used, to see sights which excite pity and indignation; and where the hammer is used the sight, too, is revolting, especially when it does not produce unconsciousness at the first blow. It all seems so unnecessary, when a humane killer is available at a very small cost and death by its use is instantaneous and absolutely painless. There is no reason why it should not be used, as in England, and if we are unable to enforce a regulation to this effect the horses intended for meat must be killed on this side. This, too, would do away with the risk of injury on the voyage, and French and Belgian inspectors can inspect the meat before export.

The Ministry of Agriculture have the matter at the present time under consideration, as also the conveyance of horses by railway, and it is to be hoped that each will presently be satisfactorily amended. Their weekly report, herewith appended, discusses each subject fairly and squarely. Let us hope that some satisfactory action will at once be taken.

THE EXPORT OF HORSES.

The export of horses for slaughter on the Continent, almost exclusively in Belgium, Holland and France, is regulated under the provisions of the Diseases of Animals Act, 1910, and the Exportation of Horses Act of 1914. Thereby no horse can be exported without a licence showing that it has been examined by a veterinary surgeon appointed by the Ministry of Agriculture, who must certify that the horse is "fit to travel and to work."

The attack that has been made upon the traffic with so much vigour and feeling is directed to two points: (1) That unfit horses are shipped; (2) that the horses are subjected to much suffering on the other side before they are killed, in that they are moved by road without food to the place of slaughter, and are brutally and cruelly handled.

It is admitted that a sufficiently high standard in the horses allowed to be exported has not always been enforced in certain northern ports. The difficulty of administration lies in the fact that the standard of what can be considered fit to travel and work is a matter of judgment; large numbers of horses have to be examined under conditions which are not always of the best. Undoubtedly, too, a part at least of this trade is in the hands of men who are not too scrupulous in the methods they adopt to get horses passed by the inspectors.

As regards the second point, it is impossible for the authorities in this country to exercise any control over or impose any conditions on the people who handle the horses after landing on the Continent.

It is clear that the agitation in this country is directed against the trade itself, and will not be satisfied by anything less than the cessation of the trade. However carefully examination on this side is conducted there will always be differences of opinion as to what constitutes fitness to work. Several observers in the countries concerned have reported that horses which would not be passed for export may be seen there at regular work. Moreover, and this is a point that those who are interesting themselves in this question overlook frequently, the main allegations of cruelty and suffering are directed against happenings outside this country.

It should be remembered, too, that the United Kingdom has a considerable and valuable export trade in horses, which is altogether apart from the traffic in worn-out horses for slaughter. These animals consist of blood stock for the improvement of the Continental breeds, harness and riding horses, of Army remounts, and to a certain extent of work horses which are past their prime, but have some years of useful work in them. It was not the intention of the Legislature to interfere with this trade, and the measures which are meant to put a stop to the traffic in live horses for slaughter, as distinct from meat, should not be allowed to make a legitimate trade unworkable.

Three methods have been suggested for putting an end to the trade: (1) Imposition of a licensing fee of £20, something that would render the trade impossible; (2) the imposition of an age limit on the horses exported; (3) the prohibition of export of horses below a certain declared value. The last proposition would undoubtedly be rendered unworkable by collusion between the dealers on either side.

As regards the first proposition, it has never been customary in this country to impose licensing fees that would, in effect, be export taxes, and would seriously handicap the legitimate export trade in horses for work or breeding. The proposal for an age limit is equally open to objection. A higher limit than seven or eight years cannot be fixed because, above that point, it becomes impossible to diagnose a horse's age. The teeth enable one to say that the horse has not yet reached an age approximately seven or eight, but would not enable anyone to certify that the horse is above or below an age like 12 or 14 years. The legitimate trade does export horses above eight years of age, and, again, some young horses are exported for slaughter only, so that an age limit would satisfy neither of the required criteria.

The object to aim at is that horses intended for food should be slaughtered on this side and exported as dead meat. The French Government are already doing this, and negotiations are in progress with the Dutch and Belgian Governments to the same end.

It may be said quite plainly that unless the export trade to Holland and Belgium can be changed from a trade in the live animal to a trade in the dead meat the Ministry of Agriculture will be driven to consider further legislation. All horses required by the Continental butcher should be slaughtered humanely on this side of the Channel, and unless the Dutch and Belgian Authorities can be persuaded to offer the necessary facilities for the development of the trade on these new and human lines, no consideration of private profits ought to restrain the Ministry from taking the necessary steps to see that the trade as carried on at present is either ended or made so difficult and unprofitable that few will care to take any part in it. At present the traffic in horses for slaughter is permitted by law, but it is clear that a growing public opinion in this country will not tolerate the continuance of the trade as it now exists even under the strictest observance of the regulations. Either the traders in conjunction with the Government concerned will have to alter their methods and conduct the business as a dead meat trade, or the Ministry will be forced to ask for powers that will stop the trade entirely.—*Ministry of Agriculture and Fisheries.*

EXPORTATION OF HORSES AND CONVEYANCE OF HORSES BY RAILWAY.

The Diseases of Animals Act, 1910, as amended by the Exportation of Horses Act, 1914, prohibits the shipment of any horse, ass or mule from any port in Great Britain to the Continent of Europe unless the animal has been examined immediately before shipment by a veterinary inspector appointed by the Ministry and certified by him to be capable of being conveyed and disembarked without cruelty, and also to be capable of being worked without suffering on arrival at its destination on the Continent. Provision has been made by the Ministry for the veterinary inspection of horses shipped under the above-mentioned Acts at the ports of London, Harwich, Hull, Goole, Folkestone, Southampton, Leith, Grimsby and Newhaven.

As it is of great importance that any illegal traffic in worn-out horses should on humanitarian grounds be prevented, the Ministry has asked local authorities of seaboard districts to co-operate with the officers of Customs and Excise at the ports, with a view to prevent shipments of such horses contrary to the Acts, and the Board of Customs and Excise have agreed to assist by instructing their officers to notify to the Ministry and also to local authorities any case in which it appears to them that the Acts are being contravened. This will enable action to be taken by the local authorities either to prevent illegal shipments taking place, or to take legal proceedings against those found guilty of an infringement of the Acts.

The Ministry has further called the attention of all local authorities to the provisions of Articles 3, 4, 8 and 9 of the Horses (Importation and Transit) Order of 1913, which prohibit the carriage by water or by railway of any horse, ass or mule which, owing to infirmity, illness, injury, fatigue or any other cause, cannot be carried without unnecessary suffering during the intended transit.

Copies of a poster warning horse dealers and exporters of the requirements of the law in this matter can be obtained on application to the Ministry, 10, Whitehall Place, London, S.W.1.—*Ministry of Agriculture and Fisheries.*

General Articles.

THE HUMANE SLAUGHTER OF ANIMALS.

By GEORGE E. BODY,
Meat and Foods Inspector, Torquay.

The following are the results of an investigation and extracts from a report presented to the Torquay Town Council relative to the slaughter of animals by humane methods, *i.e.*, the R.S.P.C.S. Killer, the Swedish Killer and the Safeti Pistol.

The investigations were not carried out for, or on behalf of, any society or persons interested in humane slaughtering, but with a view of ascertaining the effects, if any, especially in smaller animals, that shooting with the Safeti pistol would have on the bleeding, setting and keeping qualities of the meat.

The animals slaughtered were not selected for the purpose, but were taken in the ordinary course of slaughtering at the private and public slaughtering establishments in the borough.

In a number of cases the slaughtermen carried out the shooting, and those animals not shot were pole-axed and stuck by the slaughtermen, the blood being caught in vessels similar in every way as if intended for commercial purposes.

METHODS OF SLAUGHTERING.

There are two methods of slaughtering food animals in general use. Pole-axing in the case of bullocks and sticking in the case of sheep, pigs and calves. These methods in the hands of experts are efficiently and expeditiously carried out, although even in the hands of the expert the killing of the small animals from the humanitarian point of view leaves much to be desired.

There are two principles which must be kept in mind in dealing with this problem. First, to kill the animal in such a way that death occurs with the least possible delay, so as to prevent cruelty by pain. Secondly, that the animal must be killed in such a manner that the keeping qualities of the meat are not impaired or organs or parts so damaged as to depreciate their value as a commercial article of food.

The keeping quality of the meat is a very important matter, not only to the butcher, but equally so to the consumer. The mode of slaughter, assuming the animal is a healthy one, has great bearing on the matter, as the greater the amount of blood left in the carcase, the more rapidly does decomposition set in, as blood putrifies much quicker than muscular tissue, or, in other words, micro-organisms will multiply much more quickly in meat containing an excess of moisture than in meat dry or well bled. This may be noticed in rabbits and game, which are not bled at the time of slaughter.

POLE-AXING OR STUNNING.

This method of killing cattle has been in vogue from time immemorial; generation after generation of butchers have used it, so that the custom nas become so fully established that new methods are either treated with ridicule or contempt. Where this has failed the argument is raised that shot animals do not bleed so well and the flesh decomposes much more rapidly than those stunned by the pole-axe.

The same argument is used in connection with sheep, calves and pigs, great stress being laid on the point that, owing to hæmorrhage round the brain and a slight breaking up of a small portion of the brain substance, its keeping qualities and blood stained appearance depreciate its value. Admitting that the brain of a shot animal is more bloodstained than the brain of one stuck, it is only a matter of appearance. This, and the extra trouble involved in preparing it for food, is the most that can be said against it. If the brains of all animals were in a similar condition the purchaser, after a few months, would become so accustomed to their condition that no comments would be made.

Years ago it was the custom in many parts of the country to slaughter calves by suspending them by the hind legs and opening a blood vessel in the neck and allow them to gradually bleed to death. Of course, when the authorities stepped in and put a stop to this cruel method of slaughter, the butcher was up in arms at once, his contention being that any other method of slaughter would prevent thorough bleeding and that the flesh would be dark and fail to keep. But how many butchers of to-day would defend such a procedure, or could one be found who, on his affidavit, would say that customers complain that the veal is much darker in colour than formerly.

The objection raised in the shooting of calves is the presence of a small hole in the centre of the head, thus somewhat spoiling its appearance for the table. If people are so fastidious as to object to this, they deserve to be deprived of the luxury of calves head, or even sheep's head, whatever the mode of slaughter.

As regards pigs slaughtered by these mechanical instruments, the complaint is made that spots of blood appear in the region of the spine from the neck downwards; that the flesh in the region of the neck is much darker than normal; that the carcase fails to set firmly, and that its general appearance is unsatisfactory.

I can only say that such conditions have never been observed by me, either in pigs killed with the Captive Bolt Pistol or the Creener "Safeti."

Coming to the reliability of these instruments, Mr. Paddison states: "The Meat Inspector at Reading, in a letter to the *Belfast News Letter*, states that the R.S.P.C.A. Killer has been used on 2,000 animals for the Government without failure. The manager of the abattoir at Weston-super-Mare, referring to the use of the same type of killer on thousands of animals during the past five years, says: "I have still to record the first failure in its use."

The Head Slaughterman at the Government Slaughter House at Southampton, referring to the shooting of several thousands of sheep by the Greener "Safeti" Killer, states that the instrument has never failed. An equally satisfactory experience has resulted from the use for several months of the "Speary" Killer on sheep at the slaughter house of the Mid-Gloucestershire Farmers' Union, and Miss V. Wood, of the Council of Justice to Animals, informs me that: "At Wellington they kill 500 pigs a week with the Greener, and at Bath a firm kill all their pigs, large as well as small, with it, while another firm have killed over 15,000 with it."

Going further afield I find that mechanical appliances somewhat similar to those suggested here are in daily use in the public abattoirs on the Continent, and in the Kingdom of Saxony regulations made on March 21, 1892, prescribe that in the slaughtering of all animals stunning must precede the removal of the blood. In this State the choice of a stunning apparatus is left to the discretion of the butchers, although the wooden hammer is recommended for calves, the bolt apparatus for pigs, and the striking bolt hammer or a blunt axe for sheep.

Similar regulations dated as long ago as May 23, 1891, are in force in the Duchy of Meiningen.

Considering the length of time and the number of establishments in which these mechanical instruments have been in daily use (the R.S.P.C.A. alone have sold over 5,000 of their special type of Humane Killer), their efficiency has been proved beyond doubt, and in view of the investigations that have been made by qualified medical experts, meat inspectors and practical butchers, it has been proved conclusively that the bleeding, setting and keeping qualities of the carcase are not in any way impaired.

In comparing the two methods of slaughter, old and new, it is necessary so as to obtain a clear idea of the process that the operation should be described.

POLE-AXING.

A bullock, being a large animal and fairly powerful, has to be rendered harmless as quickly as possible, therefore the pole-axe was found, up to the time of the invention of mechanical killers, to be the quickest and safest method of doing this. The almost universal procedure is to pass a rope round the neck and horns of the animal, passing the rope either through an iron ring fixed in the floor or wall or through a hole in a wooden post fixed in the floor or wall. The head is then placed in such a position that the slaughterman, by an overhead stroke, can bring the pole-axe down with considerable force. The pole-axe, being provided with an iron spike, penetrates the head of the animal, injuring the brain and rendering the animal unconscious. A cane is then inserted in the hole made by the pole-axe (termed " Pithing "), which breaks up the connection between the brain and the spinal cord, destroying the nerve centres and preventing risk of the animal rising again. The animal is then bled by thrusting a knife in the throat, when the large blood vessels in the neck are severed, thus leading to the draining of the carcase and organs of blood.

This method of slaughter, when carried out by a skilful man, is practically painless, as the blow of the axe at once renders the animal unconscious, but in the unskilled or for want of strength on the part of the slaughterman, several blows with the axe are often necessary before the animal is felled. In fact, I have seen animals with an eye knocked out owing to bad aiming, and I have also seen animals felled and rise again and clear the slaughter-house of the workers, when a gun has had to be obtained and an opportunity awaited to shoot the animal.

But in slaughtering with one of the Humane Killers the risk of failure to thoroughly stun the animal, or inaccuracy of aim, is reduced to a minimum, as the instrument is placed directly in the centre of the head so that, when fired, the bullet cannot fail to enter a vital part of the brain, causing violent concussion of the brain and instantaneous unconsciousness.

In the slaughtering of sheep the common method is, without any attempt at stunning, to sever the blood vessels in the neck and let the animals bleed to death, unconsciousness only appearing when the brain is deprived of blood (cerebral anæmia).

Now, consider the difference in the case of the animal stunned prior to sticking. The muzzle of the pistol is placed on the animal's head over the brain and the trigger pulled; the cartridge is at once discharged; the bullet smashes through the bone covering the brain, causing violent concussion and instantaneous unconsciousness, and all pain associated with sticking is eliminated. Pithing is unnecessary, consequently the vital centres are not damaged, therefore bleeding is more thorough. This is well shown in the case of the liver and lungs, as the capillaries of these organs are invariably found to contain less blood.

Pigs are slaughtered by thrusting a knife in the underside of the throat and severing the large blood vessels of the neck, when the animal bleeds to death. Owing to the thickness of the skin or folds of fat, it is frequently found necessary to cut the skin before thrusting the knife into the throat.

The method of slaughtering calves is to tie strong cord round either one or both hind legs and to hoist them clear of the ground by means of a rope and pulley. The animal is then pithed by thrusting a knife in the back of the neck between the atlas and occipital bone, thus severing the spinal cord, afterwards cutting the throat in the same manner as with sheep and allowing the animal to bleed to death.

This method of slaughter is a gruesome sight to watch, for unless the pithing and sticking are expeditiously and skilfully done, some little time elapses before the animal dies, during which period it frequently moans and shows evidence of being in pain. Needless, but of course, quite unintentional, pain is caused if a sharp-pointed knife is not used or if the operator is not skilled at the work, or if from some cause the rope breaks or slips from the legs after the animal is raised from the ground.

In my opinion the dagger-pointed knife is preferable to the one usually employed, but men object to them on account of the risk of missing the spinal cord owing to the width between the last bone of the spine and first bone of the head. This, to my mind, shows that this method of slaughter is not the best or simplest way of killing the animal.

" In the Government districts of Gumbinnen and Dusseldorf the killing of cattle by pithing is forbidden, and the same is true—or was—previous to the war for the whole Russian Empire, in which it was previously the exclusive method of slaughter. The abandonment of pithing as a method of slaughtering in Russia was chiefly brought about by the experiments of Dembo, who showed that pithed steers still ate salt and bread which was offered them." (Dr. Ostertag.)

RESULT OF INVESTIGATION CARRIED OUT AT TORQUAY.

CATTLE.

Two cows and two bullocks were slaughtered by the Swedish humane killer. These animals were not selected for the purpose, nor were previous arrangements made, but were killed by this method as the opportunity permitted.

15/2/21. *Bullock No.* 1. The shooting was carried out by the slaughterman at the abattoir, who had never before seen or used this particular instrument. The animal was promptly and efficiently stunned, falling with fore legs extended and hind legs flexed. The animal was not pithed, such not being necessary. The animal bled freely, but the blood was slightly darker than in a pole-axed animal.

21/2/21. *Cow No.* 2. The instrument was lent to a butcher for testing. On enquiring the result he said : " Everything was alright."

23/2/21. *Cow No.* 3. Animal between six and eight years old. The animal was promptly and efficiently stunned, falling with fore legs extended and hind legs flexed. On placing the finger on the eyeball no flickering occurred, thus showing the animal was quite unconscious. A little time elapsed from the moment of sticking to the commencement of bleeding, owing to oversticking, but the animal bled well. A sample of blood, approximately 2 gallons, was obtained and set aside to allow the serum to settle. The blood appeared slightly dark. The animal was not pithed.

An examination of the brain showed that the bullet entered the brain about ¾ in. from the tip of lobe near nose, embedding itself in the base of the brain cavity. Hæmorrhage was present over an area of about 1½ ins. where bullet entered, and a little blood was found in the base of the brain cavity.

All organs and carcases were normal except for a large clot of blood in the chest cavity, due to oversticking.

24/2/21. *Bullock No.* 4. Animal about three years old. I was too late to see this animal shot, but the slaughterman informed me he failed to see any difference in bleeding or position in which animal fell. Everything appeared similar to one pole-axed, but if anything the animal bled more freely.

I examined the carcase and organs about half-an-hour after slaughter, when everything appeared normal, except on cutting the liver coagulated blood was not present in the capillaries.

APPEARANCE OF THE CARCASE.

Cow No. 3. An examination of the carcase after 28 hours showed it to be well set and normal in colour, and an examination of the parts of the carcase after 48 hours revealed no change in the muscular tissues, and a fore quarter after six days showed that it had not deteriorated in any way, and was perfectly firm to the touch.

Bullock No. 4. Part of the carcase of this animal, when exposed for sale in the shop 20 hours after slaughter, I failed to select from parts of a pole-axed animal.

EXAMINATION OF THE BLOOD.

The blood from *Cow No.* 3 clotted rapidly and normally, one quart of serum being obtained from nearly two gallons of blood. The serum was pink in colour, whereas serum from pole-axed animals is generally straw colour, but this depends to a great extent as to how the blood is caught in the storage vessel.

PIGS.

28/2/21. One pig was shot by the Greener " Safeti " pistol, as used for stunning sheep.

The animal was promptly and efficiently stunned, falling at once with legs flexed. It was stuck about 40 seconds after falling. Muscular movement was more persistent than in the case of sheep, but all movement ceased about two minutes after shooting. The animal bled well, and the blood appeared normal in colour.

I examined the carcase about three hours after slaughter. It was well set and perfectly normal in appearance; the internal fat and fat on the back was not discoloured. (Extravasion of the blood in patches.) Post-mortem examination of the head revealed the presence of hæmorrhage between the skin and the bone of the skull at the point where the bullet entered. The brain substance was practically uninjured, only the tip of the fore part of the organ being damaged. There was slight hæmorrhage at this point between the membrane and brain tissue, and a small accumulation of blood in the cavity forward of the medulla. The spinal cord, chine and muscular tissue of the neck were absolutely free of blood, a condition exactly opposite to that alleged by some butchers.

An examination of parts of the carcase when exposed for sale in the shop 28 hours after slaughter appeared in every way similar to an animal stuck by the old method of slaughter.

SHEEP.

26/2/21. *Sheep No.* 1. Killed by "Safeti" pistol. The eyes closed immediately after shooting. The animal struggled, but not so persistently as animals "stuck." Blood was bright red in colour, and appeared to bleed better than in sticking. Sample of blood retained. This was examined on Sunday afternoon, about 30 hours after drawing, when 8 ozs. of serum was obtained, apparently a normal quantity.

Remarks.—Brain. Hæmorrhage round brain about 1¼ ins. in area; small quantity of blood in brain cavity; brain not broken up as shot entered about ½ in. from top of lobe at base of forehead. No blood in neck or spinal column. The liver on being cut was found to contain less blood in the capillaries than in the animal that was stuck at the same time.

Wednesday, 2/3/21. Cow shot by "Swedish" killer. The animal was at once stunned, being rendered unconscious instantly. It bled freely and the blood was normal in colour. The brain was in no way damaged, the amount of hæmorrhage being little more than in one pole-axed. The carcase and all internal organs were perfectly normal.

The carcase after 24 hours had "set" well, and showed no appearance of blood staining.

Three sheep were shot with the "Safeti" pistol at the same time and one was stuck. Apart from the presence of a very small hole in the skull where bullet entered there was nothing to distinguish the shot from the stuck carcase. After removal of the heads, when carcases were exposed for sale in the shop, it was impossible to say which had been shot or stuck.

I removed the brain from one of the shot animals and found the membrane in the vicinity of the bullet hole slightly bloodstained, but the lobes were not broken up. The bloodstained membrane was easily removed after soaking in salt water, and on being cooked no odour or taste of gunpowder could be detected.

Wednesday, 2/3/21. A pig of about 10 score was shot with the "Safeti" pistol, two shots being fired, but both proved insufficient to stun the animal, consequently it had to be stuck.

An examination of the head showed that the bullet had penetrated the skull, but not the layer of bone covering the brain. Apparently this type of bullet is too soft and the explosive not powerful enough to propel it through the hard layer of bone of a pig of the age and weight experimented upon. The point at which bullet entered the head would have penetrated the lower part of the brain if the bone had been softer or thinner, so there was no doubt as to the accuracy of the aim.

It was subsequently found that the cartridge used for this test was not of the correct type. A cartridge supplied with a higher explosive power and larger bullet should have been used.

Wednesday, 2/3/21. One calf was shot by the "Safeti" pistol, which proved very effective. Animal bled and "set" well.

Thursday, 3/3/21. Eight sheep were shot by the "Safeti" pistol. These animals bled well, but the blood which flowed from three of them after sticking was dark in colour, while the blood from the other five was of a bright red colour. All animals were killed within half an hour, all having been kept in the same pen. The carcases "set" well, and there were no complaints as to their condition.

CONVULSIONS.

The daily press recently gave an extract of a lecture delivered by Sir A. Wright, who is a pathologist of some repute, wherein he states "that he had been informed that the pistol was unsatisfactory, because the flesh of animals killed by this weapon decomposed rapidly, whereas animals that were pole-axed remained fresh much longer. The explanation of this difference is to be found in the fact that animals shot through the head by a pistol fall down in convulsion, while such convulsions are absent after the use of the pole-axe. These convulsions cause the flesh to become acid, and the acidity hastens decomposition."

Although Sir Almroth does not say so in so many words, his statement leaves the impression that the muscular tissue of a pole-axed animal has an alkaline reaction, and that of a shot animal an acid reaction ; the inference that shooting with one of these humane killers brings about the latter condition owing, apparently, to the animal dying in convulsions.

Evidently Sir Almroth has not personally investigated the matter, otherwise he would have ascertained that, so long as the animal was in good health and a normal condition, *i.e.*, not suffering from the effects of a fatiguing journey or terrified or excited, neither shooting or pole-axing affects the reaction of the muscular tissues.

The investigations carried out by me have shown that muscular tissue immediately after death has an alkaline reaction, but as rigor mortis sets in, or what the butcher calls "setting," the muscle has an acid reaction. This condition remains in both shot and pole-axed animals until about the sixth day. Weather conditions have, of course, some bearing on the matter.

Take one case in point, which is only one of many tested during the past three months, all with the same result. Two animals, one a cow, the other a bullock, were slaughtered on May 9, the former being shot with the R.S.P.C.A. killer and the latter pole-axed. On the 11th to the 14th the tissue of each animal had an acid reaction and on the 16th a neutral reaction. As the remainder of the carcases were sold that day for consumption the test could not be carried further.

These tests are consistent with all text-books dealing with the subject.

Halliburton states :—" The cause of rigor is the coagulation of the muscle plasma. This coagulation results in the formation of myosin, and is gradual in onset. Simultaneously the muscles (*a*) become shortened and opaque, (*b*) heat is evolved, (*c*) they give off carbonic acid, and (*d*) become acid in reaction ; this is due in part to the formation of sarcolactic acid and in part to the formation of acid phosphate."

Smith (" Veterinary Physiology ") states :—" The muscles become firm and solid . . . further, it loses its alkaline reaction, and in course of time becomes acid owing to the formation of lactic and other acids."

" The rapidity with which rigor mortis sets in differs according to the mode of death. If an animal in perfect health be destroyed the muscle stiffening is slow to set in and very persistent ; where death is produced by debilitating disease, or in cases where severe muscular exhaustion has preceded death, the rigor mortis may occur so suddenly and pass off so rapidly as occasionally to escape observation, and decomposition also sets in early."

Ostertag writes :—" The reaction of the musculature during life is neutral, but becomes acid (sarcolactic acid and volatile fatty acids) soon after death. . . . The presence of acid causes the beginning of rigor mortis. The increase of acid contents, however, brings about a cessation of this condition under the influence of putrefactive bacteria, the acid reaction of the musculature gradually becomes alkaline (presence of ammonia)."

One could quote many other authorities on the subject, but all give the same results.

The other statement attributed to Sir Almroth Wright that animals shot die in convulsions is somewhat difficult to follow, as it leaves one to assume that pole-axed animals are not so affected, so is a condition peculiar to and characteristic of death by shooting. Unfortunately Sir Almroth does not enlighten us as to the foundation on which he enacts his theory unless it arose from a perusal of the Belfast Report, where it is stated that shot animals fell with " legs firmly flexed," while pole-axed animals fell with " legs extended."

The firmly flexed legs, we must assume, arose from a violently involuntary muscular contraction, a spasm or convulsion, a condition in which the animals were supposed to die.

From my personal observations I can firmly say that this contraction or bending of the legs is not peculiar to shot animals at all, but occurs just as frequently in animals pole-axed, and is caused, in my opinion, by the injury of a certain part of the brain and irrespective of the actual instrument used. Whether the pole-axe or ball cartridge is used the animal is rendered unconscious by penetration or injury to the brain, followed by hæmorrhage in the brain. The animal, if effectually stunned, whether shot or pole-axed, does not move until pithed or the blood vessels of the neck are severed, then muscular reaction takes place more or less violently until bleeding ceases. The violence or extent of this muscular reaction depends, in my opinion, more upon the idiosyncrasy of the animal than the method of slaughter.

But to say that a shot animal dies in convulsions is not justified by experience. The general muscular spasms are merely reflex contractions. Animals that have been overdriven or badly injured owing to unskilled use of the pole-axe, creating terror or emotional stress, a state of affairs I have occasionally seen, may die in convulsions, but never with shooting, whether it be a humane pistol or shot gun.

(*To be continued.*)

RICKETS AND VITAMINS.

In the April number of the *British Journal of Experimental Pathology* Professor D. Noël Paton and Mr. A. Watson, after a brief recapitulation of their previous work on the subject, give a detailed account of further experimental investigations into the ætiology of rickets in pups. They use throughout pups from the same litters for comparative tests, as, in their opinion, the susceptibility of different strains is so varied as to invalidate statistics collected except on this principle.

The object of the first of the new series of experiments recorded has been to test the possibility of rearing dogs free from rickets, when confined in a laboratory, on diets: (1) rich in milk-fats, and (2) poor in fats supposed to contain an anti-rachitic factor. Both sets of pups developed rickets, but those on an abundant diet less rapidly. In order to ascertain whether this delay could be attributed to a decrease in susceptibility due to more ample energy intake, apart from the influence of any accessory food factor associated with milk-fat, a second series of experiments was undertaken. Pups from three litters were divided into four classes, in each of which the energy intake was kept ample throughout the whole period of growth mainly from one of the following sources: (A) Whole fresh milk and bread

(2 pups); (B) whole dried milk and bread (3 pups); (C) separated milk, bread and lard (4 pups); (D) separated milk and bread (9 pups). Two of the pups in Class D were kept in a large kennel with an open yard, and were freely exercised every day; and in order to try and hasten the onset of rickets two others, also in Class D, were kept in a rabbit hutch from the age of 12 weeks to the age of 16 weeks. The rest were kept in a laboratory, a large sunny room with a concrete floor, in movable pens measuring 5½ feet square. Very special precautions were taken to ensure cleanliness. Of these pups, one, in Class B, died at the end of the ninth week of the diet, not from rickets. One only, in Class D, of the remainder developed rickets. The conclusions drawn from these experiments by the authors are as follows :—

(1) In young dogs under ordinary laboratory conditions a liberal allowance of milk-fat, up to even 14 g. daily per kilo of body-weight, does not prevent the onset of rickets.

(2) Pups kept largely in the open air may escape the development of rickets on an intake of less than 1 g. of milk-fat per kilo of body-weight.

(3) With scrupulous care as to cleanliness it is, at least sometimes, possible to rear pups free of rickets in the laboratory on an intake of only about 0·5 g. of milk-fat per kilo of body-weight, along with bread, provided that the diet affords an adequate supply of energy.

(4) The energy value of the diet, however supplied, quite apart from the presence of any hypothetical anti-rachitic factor in milk-fat, would seem to play a part in controlling the development of rickets; but that it is only a contributory part is shown by the development of rickets in pups with a high energy intake if confined in the laboratory without scrupulous care as to cleanliness.

(5) Milk-fat may be reduced to about 0·3 g. per kilo of body-weight, if its place is taken by an equal amount of lard, without the onset of rickets.

(6) The results of these observations give no support to the conclusion of the Accessory Food Factors Committee of the Medical Research Council that rickets is a deficiency disease due to a lack of an anti-rachitic factor in the diet.

Much work on accessory food factors has been done since the publication in 1919 of the report referred to. With more knowledge distinctions have become less absolute. For example, Professor E. Mellanby,* referring to the observations of Hess and Unger, emphasises the difference in distribution of the fat-soluble factor and the so-called anti-rachitic factor in vegetable fats. He says that though cotton-seed oil is generally accepted as containing no fat-soluble A, in his experience it is one of the better vegetable oils in preventing rickets. And investigators are by no means agreed even on the presence or absence of fat-soluble A in any given foodstuff. Professor Paton, following most authorities, assumes that lard is considered vitamin-free, while quite recent work by Dr. J. C. Drummond† differentiates between lard derived from grass-fed pigs and those fed on a diet deficient in vitamins. In the former he has found fat soluble A. Incidentally Professor Paton deduces from the first experiment quoted above that for experimental purposes "dried milk may safely be substituted for fresh milk." Dr. Drummond classes their relative content of fat-soluble A as ++ and +++. Since quantitative results that cannot be expressed numerically are of doubtful value, not even the firmest adherents of the vitamin hypothesis could regard this as an important contribution to the question of the form in which milk ought to be supplied to children. We only mention it as a further sign of what an enormous mass of work yet remains to be done before the presence or absence of a vitamin from any foodstuffs, still less the ætiology of rickets, can be proved. In fact, those who are inclined to be quite bewildered by the conflicting results of different eminent observers in the same field can derive some help from a critical essay by T. B. Osborne and L. B. Mendel.‡ These authors draw attention to the contradictions existing in the literature as to the presence or absence of a fat-soluble vitamin in a given experimental diet, and are inclined to attribute the discordant results of various workers to traces of this vitamin in certain diets generally considered free from them. However, they agree with Professor Paton in emphasising that the crucial experiment in which nutritive failure ensues immediately upon giving a diet deficient in this respect has not yet been done. They might have gone even further. Until a more accurate quantitative basis of estimating vitamin content can be attained the question must remain unsolved.—*The Lancet.*

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* *The Lancet,* 1920, i, 857.

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† Maternity and Child Welfare, May, 1921.
‡ Jour. Biol. Chem., 1921, 45, 277.

CANCER IN ANIMALS.

At a recent meeting of the Académie de Médecine Mr. Cadiot read an interesting paper* on the distribution of cancer in animals, utilising a number of facts and figures taken from the literature in order to draw conclusions on some of the general problems of cancer. From the fact that carnivorous and herbivorous animals show no great difference in the incidence of cancer, the author deduces that diet does not constitute an important factor in the genesis of cancer. Age, in animals as in man, stands out as the predominating factor. There are, however, interesting differences in the incidence of cancer in so far as it affects the different organs, and these differences also exist between different species of animals. Thus cancer of the penis appears to be particularly frequent in horses, and according to the author occurs most frequently in castrated animals. In oxen the atrophy of the testicles, which takes place after castration by "twisting," presents a predisposing factor for the development of malignant growths, chiefly of a sarcomatous type. The author is, however, on very debatable ground when he tries to prove from the incidence of cancer in animals that chronic irritation is of comparatively little importance. He bases his argument chiefly on the assertions that cancer of the digestive tract of animals is very rare, and that in draught animals cancer of the skin does not develop in those sites where the pressure of the collar and the friction of the harness produce a chronic irritation. A glance at the tables published in the Third Scientific Report of the Imperial Cancer Research Fund entitled, "Malignant New Growths in Domesticated Mammals," shows that cancer of the digestive tract is not as infrequent as Mr. Cadiot believes it to be. And he must surely have forgotten the "horn core" of cattle in India, where a squamous cell carcinoma develops with great frequency at the root of the right horn in cattle employed for draught purposes, the right horn being used to attach the animal to the wagon. But the whole question of the relation of chronic irritation to the causation of cancer has during the last few years been raised from the slough of argument and placed on a secure basis by experiment. The work of Fibiger on the experimental production of cancer of the stomach by feeding with spiroptera, and the experimental production of cancer by prolonged painting with coal tar—first successfully demonstrated by Yamagiwa and Ichikawa, and since confirmed by Fibiger and by Murray and Woglom in this country—represent important advances of our knowledge of the origin of cancer. A grain of experiment, properly conducted, is worth at least an ounce of argument.—*The Lancet.*

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* *Bulletin de l'Académie de Médecine,* 1921, No. 13, Séance du 29 Mars, 1921, p. 396.

VIRULENT DIPHTHERIA BACILLI CARRIED BY CATS.

ALTHOUGH the available literature on the transmission of diphtheria from cats to human beings is not convincing owing to the incompleteness of bacteriological examination, many cases have been recorded based on clinical evidence alone. Major James S. Simmons,* chief of the Laboratory Service, Walter Reed General Hospital,

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*American Journal of Medical Sciences, October, 1920.

Takoma, D.G., now reports a case in which he offers bacteriological evidence of this transmission. The patient was an elderly woman who developed a fatal attack of faucal diphtheria after fondling a cat which had been ill one week before the patient's illness began. The cat was said to have had a croup cough, to have been unable to swallow food, and to have become very thin. The symptoms were at first attributed to a piece of chicken-bone having lodged in its throat. Faucal cultures from the cat and from the patient showed morphologically similar organisms, resembling diphtheria bacilli, and the virulence for guinea-pigs was the same, the organisms in both cases killing guinea-pigs six days after subcutaneous injection, but failing to produce lesions in animals previously injected intraperitoneally with diphtheria antitoxin. The cat was chloroformed and a careful post-mortem examination made. The only lesion detected was a small oval ulcer covered with a yellow-grey membrane on the upper surface of the left nasal fossa, cultures from which showed diphtheria bacilli. Throat cultures from a second cat, which had often played with the first, also showed morphologically typical diphtheria bacilli. The second cat died after eight days' confinement in a cage, and *post-mortem* showed small membranous patches, from which virulent diphtheria bacilli were isolated, on the vocal cords. The history of contact, dates of infection, and bacteriological findings suggest that the first cat was the source of infection of the patient as well as of the second cat, though, as Major Simmons admits, this cannot be proved. It is certain, however, that both cats were carriers of virulent diphtheria bacilli, and were therefore a danger to human beings.—(*The Lancet*).

THE MOVEMENT TOWARDS LIVE STOCK IMPROVEMENT.

Although a policy of the closest economy has been imposed upon all Government Departments, and it has been found necessary to abandon many schemes of interest and value, the policy of improving the live stock of these Islands still receives a measure of support, and for the financial year now opening (1921-1922) it has been found possible to allocate a sum of £35,000 for use in England and Wales. Of this amount £18,000 is set aside for grants for bulls, £7,800 for Milk Recording Societies, £7,250 for heavy horses and £3,000 for boars. The provision covers grants for 900 bulls, 600 boars, 100 heavy horses and for a few rams which will be used in North Wales, this last being a comparatively new experiment. The value of the grants is very considerable; it is both direct and indirect. For example, the Live Stock Scheme can claim to have led to the formation of several new Breed Societies with consequent improvement both in the class of the animal and in the price paid for it. It is noticeable, too, that during the period when the slaughter of calves was at its height, very few calves sired by subsidised bulls went for slaughter. It was clear that those who had bred a good calf were not disposed to see it turned to veal. The mere fact that it had good parentage was sufficient justification for an effort to rear it. Then, again, there is a very brisk private market in premium sires, and although they may be bought in the first instance at quite a low figure, that figure tends to rise very considerably as soon as their worth is proved. For example, a boar bought for twenty guineas under the Live Stock Improvement Scheme was sold some time later for six hundred, while a subsidised bull sold for service in a pedigree herd sired nine bull calves which averaged upwards of five hundred guineas apiece. Figures of this kind have an eloquence that is irresistible. The heavy horse grants have been found to encourage co-operation among farmers for the hire of good class stallions, and those who know how careless the farmer was in this regard only a few years ago will admit the ample room for improvement. Quite apart from results that have in them something of a sensational element, live stock officers of the Ministry are able to record a state of general progress. For example, it is reported from one farm that the calves bred from a premium bull made £10 more per head than others born on the same farm from another sire. The possibility of securing good strains has led to the establishment of several new herds of Shorthorns in various parts of the country. In one instance, a bull bought under the Live Stock Scheme for £240 was sold for 550 guineas to go abroad, while another that cost 43 guineas under the Scheme ultimately reached the Argentine, where it fetched 550 guineas. The owner of one of the Society's bulls won first prize at the Royal Norfolk Show and has refused £250 for the animal. At the same time it is noticed that service fees are much higher than they were, and are paid without complaint for the use of registered sires.—*Ministry of Agriculture and Fisheries.*

LIGHT HORSE BREEDING : STATE ENCOURAGEMENT.

For ten years past the Ministry of Agriculture has devoted about £30,000 per annum to assisting and encouraging the light horse breeding industry in England and Wales. The methods adopted fall under three heads :—

(1) Licensing (formerly registration) of sound stallions to travel through the country for service on the farms.

(2) The award of premiums to the owners of those thoroughbred stallions which travel at a nominal service fee of £1.

(3) The leasing of brood mares to farmers.

It may be remembered that the Horse Breeding Act of 1918 superseded the earlier system of voluntary registration introduced in 1911. The Act of 1918 came into operation last year, when no fewer than 3,750 stallions were licensed by the Ministry. This good work is still in the initial stage and some years may elapse before the full benefit is felt throughout the rural areas of England and Wales, but it is not too early to note with satisfaction the elimination of large numbers of the unsound stallions that could be met along any country road in the late spring and early summer and were travelled profitably, for their owners, on account of the low service fees charged. It has long been a reproach against a certain class of farmer that he has been prepared to accept for his stock any sire for whose service the price was low, and the result has been that in this country where the finest animals are to be found, there is a great residue of the very worst. The Horse Breeding Act is gradually putting an end to this condition as far as horses are concerned, and those who travel an unlicensed stallion to-day commit an offence for which the penalty is not inconsiderable. All things considered the Act has worked smoothly; complaints have been few and there have been sufficient prosecutions to enable those who have no regard for the objects of the Act to realise that it is a force that must be respected. In the current estimates provision has been made for premiums to one hundred thoroughbred stallions and a number of Welsh Cobs as well as Riding, Fell, Dale, Mountain and Moorland ponies.—*Ministry of Agriculture and Fisheries.*

Clinical.

FURTHER NOTE ON HABRONEMIASIS.

By Major J. R. HODGKINS, D.S.O., F.R.C.V.S.,
Secunderabad, India.

In the *Journal of the American Veterinary Medical Association* for July, 1920, B. H. Ransom and M. C. Hall, in an article on "Parasitic Diseases of the Southern United States," discuss Habronema and make suggestions as to treatment. "As regards treatment, no adequate tests of anthelmintics for these worms in the stomach have yet been made." They go on to suggest oil of chenopodium, and carbon bisulphide might be useful.

This note is written to give the result in the hands of the writer of these drugs, and of them and a combination with subcutaneous injections with atoxyl.

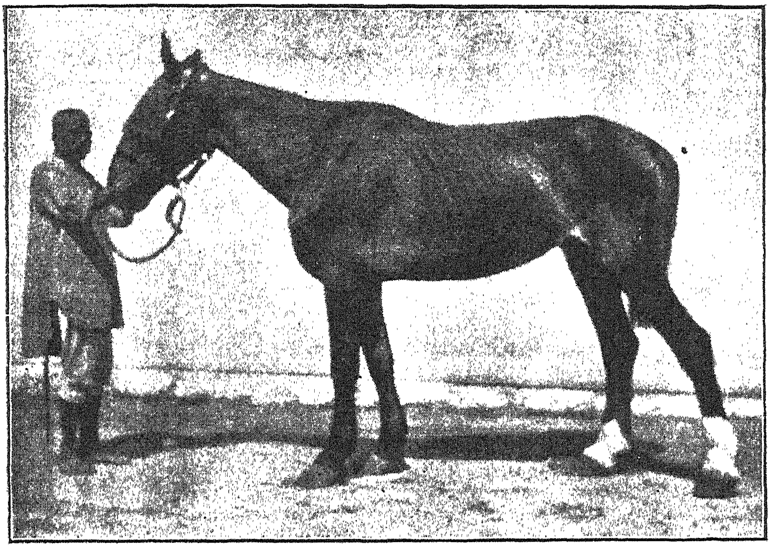
An Australian gelding, eleven years old, Clydesdale cross-type of medium draught, was admitted to hospital with debility. The photograph illustrates his condition at this period. The routine tests and examinations having been made (*vide* debility card attached), he was prepared for the vermifuge—two days on mashes, followed by thirty-six hours of fasting. (Note the loss of condition during this period, which has been found to be fairly constant in a great number of observations, viz., 20 to 30 lbs.) At the conclusion of the fasting he was given :—

℞.

Carbon bi-sulphide	..	℥vi
Ol. lini ..	.. ..	Oii

with a stomach tube. (This is undoubtedly the most satisfactory method of administration, as it absolutely ensures the animals getting the whole dose.) The result of the dose is shown in the appended card.

On the Saturday of the second week he received 60 mils. of a 4 per cent. solution of atoxyl subcutaneously. (See this Journal, June, 1920, concerning the negative results obtained by intravenous injections of tartar emetic.) On the succeeding three Saturdays he received the same injections of atoxyl. This treatment was supplemented by light exercise, grazing and feeding, as indicated.



The growth during the period is shown in the card. It seemed to reach its maximum at the end of the fifth week and then to fade away rapidly. A furnished animal of this type should weigh 1,200 lbs.

He was cast and destroyed.

Post-mortem Examination.—All the organs were apparently healthy with the exception of the stomach. It is unnecessary to enter again into the description of lesions caused by these nematodes. (See this Journal, June, 1920.) It is sufficient to say there were two sub-mucous abscesses—one of the size of an orange, the other of a walnut, crammed with pus alive with *H. Megastoma*. The mucous surface of the stomach was invaded by masses of the other habronemæ, very much alive and well. The assistant at the post-mortem was asked if the stomach surface reminded him of anything, and he replied : " Well, it seems to have the grain of nearly cold boiled beef." This is, perhaps, not a very exact pathological picture, but the condition had its appeal even for the layman.

DEBILITY CARD.

Unit.	No.	Date of Admission.	Probable Cause.
—	—	—	Parasitism (Intestinal).

Examination ...	Result	
	Mallein Test ...	Negative.
	Blood Examination...	Negative.
	Vermifuge Test ...	Oxyures. Strongyles.
	Dental Examination	Enamel points.

Weight		Cwts.	Lbs.	Gain.	Loss.	
	Admission	...	980	...	...	...
	1st Week...	...	960	...	20	...
	2nd ,, ...	...	980	20	...	...
	3rd ,, ...	...	1,010	30	...	...
	4th ,, ...	...	1,040	30	...	...
	5th ,, ...	...	1,088	48	...	...
	6th ,, ...	...	1,100	12	...	...

Total ... ... Absolute gain = 120 lbs.

Rations ...					Lbs per day.	
					1, 2, 3.	4, 5, 6.
	Barley ...	...	...	...	2	8
	Gram ...	...	...	...	2	3
	Koolthi ...	...	...	...	...	...
	Oats ...	...	...	...	6	...
	Linseed ...	...	...	...	...	...
	Bran ...	...	...	...	2	2
	Dry Grass	...	...	...	20	20
	Chaff ...	...	...	...	5	5
	Lucerne ...	...	...	...	5	5
	Guinea Grass	...	...	...	5	5

Result and Remarks	The loss in the first week is due to the vermifuge test. Received 60 c.c.s of a 4 per cent. atoxyl solution every Saturday in second, third, fourth, and fifth weeks. The rations of the first three weeks and the second period were as shown in the two columns.

It is, perhaps, interesting to note that there was only one bot present. It was alive. There were no other parasites obvious in the intestinal tract, so the treatment had been efficacious elsewhere.

So much for carbon bisulphide and atoxyl in the treatment of this disease. It only remains to say that the writer has had the opportunity of making post-mortem examinations on several animals which had received

℞.
Ol chenopodii .. .. ʒivss
Ol lini .. .. .. Oii

as part of their treatment. In every case habronemæ had survived the ordeal. It thus remains to find an " adequate anthelmentic for these worms in the stomach of the horse."

THREE ANIMAL PARASITES.

BY J. F. CRAIG, M.A., M.R.C.V.S.
(*Principal of the Royal Veterinary College of Ireland, Dublin.*)

(1) ASCARIS MEGALOCEPHALA IN AN UNUSUAL POSITION.

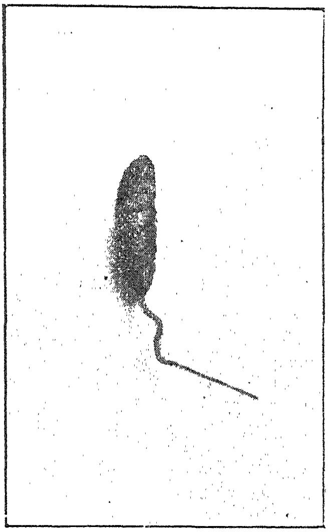
ON September 1, 1917, I received three specimens of the Ascaris megalocephala from Mr. H. Dolan, M.R.C.V.S., Mohil, Co. Leitrim, with the following history :—An enlargement appeared in the region of the umbilicus in a colt 15 months old. The swelling ruptured spontaneously and six worms escaped. A day or two afterwards three more worms, the specimens which were forwarded to me, were removed by Mr. Dolan. The colt was at first dull, not feeding properly, and had a temperature of 103° F. The swelling was fomented once daily with 1-1,000th solution of corrosive sublimate. It rapidly decreased in size, the dulness disappeared, and the animal began to feed well. In about fourteen days the swelling had altogether subsided and the colt had completely recovered. The three ascarides were 14.5, 14.5, and 18.7 c.m. long respectively, and proved to be adult males. The remarkable feature of the case is the most unusual position occupied by these worms, and I have not come across a record of a similar nature. The presence of the worms in the umbilical region is not easily accounted for. Judging by analogy from the route taken by Ascaris Lumbricoides, as described by Stewart and Ransom (*a*), one might suppose that the worms migrated from the bowel as larvæ and became side-tracked under the peritoneum in the umbilical region, and there they reached the adult stage, causing the enlargement from which they afterwards escaped. In any case, whether they left the bowel as larvæ or as adults, the breach in the intestinal wall must have been very slight and rapidly repaired. There did not appear to be any continuity between the lumen of the bowel and the swelling, no intestinal contents issued with the worms, and the subsequent rapid recovery of the animal is also opposed to that view.

(2) LARVÆ OF WARBLE FLIES IN THE HORSE.

It has been held by Joly (*b*) that the larvæ found in warbles met with in the horse belong to a separate species of hypoderma, although the adult fly has not been reared out from the maggots. Railliet in France, and Mégnin, identified some specimens as the larvæ of the Hypoderma bovis in the penultimate stage. I was able to secure two batches of larvæ during the past few years, one taken from a military horse and the other from a four-year-old dun pony treated in the clinique. The latter animal had about a dozen warbles scattered over the sides of the abdomen and thorax and the back and loins. They were about the size of hazel nuts, fairly well defined, and not very painful. The hair over them had become agglutinated with a glairy, yellowish-white pus, which had evidently escaped through a small opening at the summit of each of the swellings. After enlarging ne openings a small maggot, together with some pus, was squeezed out of each of the warbles. These larvæ were whitish in colour, somewhat spindle shaped, with blunt extremities; they varied in length from 12 to 15 mm., and were provided with a thin almost transparent cuticle. They differed from the larvæ of the horse warble described in "Neumann's Parasites" (*c*) amongst other things by the possession of spines on the rings. Prof. Carpenter, D.Sc., Royal College of Science for Ireland, Dublin, examined these specimens for me and identified them as the third stage larvæ of one of the Hypoderma of the ox, whether Hypoderma bovis or lineata he was unable to state. It is quite possible that if the larvæ in the warbles of the horse were more generally examined, the Ox Hypoderma might be found to be the only, or at least the chief, fly responsible for the production of warbles in equines. That the larvæ were only third stage larvæ and had not attained maturity might account for the failures previously experienced in raising the adult fly from the maggots.

(3) RAT-TAILED LARVÆ.

During the past few years several specimens of rat-tailed larvæ have been forwarded to me with the information that they have been passed in the fæces of cattle. Two of the batches came from Co. Leitrim and Co. Mayo. In each instance there was a definite assurance that the larvæ were present in the fæces at the time of defecation, and had, therefore, presumably traversed the alimentary canal. The photograph shows their main features. They are remarkable for the possession of a long, extensible anal breathing tube, which is arranged almost like a telescope at the posterior extremity of the body. When the larva is swimming about in fluid the end of this tube projects above the surface of the medium. The specimens I have vary in length from 20 to 45 mm., and the breathing tube is as long as, if not longer than, the body. The specimen in the photograph measures 45 mm. in length and the breathing tube 25 mm. The flies of which these are the larvæ belong to the family of Syrphidæ, and are commonly called Drone flies. The Eristalis tenax (*d*), the drone fly, resembles the drone bee in appearance, and feeds on the nectar of flowers. It deposits its eggs on liquid manure, and there the larvæ hatch out and develop. They may pass readily into pools, ditches or streams subject to sewage contamination, and thus cattle may occasionally pick them up in the drinking water. In only one of the cases from which the specimens came were any symptoms noted which could be attributed to these larvæ. In this case the ox was stated to have become affected with colic, was uneasy and restless, constantly lying down and rising again, but still feeding. A purgative was administered and several larvæ passed in the fæces. The symptoms then disappeared. It is interesting to note that the human subject has also occasionally been found to afford a temporary residence to rat-tailed larvæ.—*Department of Agriculture and Technical Instruction for Ireland.*



Rat-tailed Larva.

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(*a*) "Life History of Ascaris Lumbricoides and Related Forms." R. H. Ransom and W. D. Foster. *Journal of Agricultural Research,* Vol. XXI, No. 8. November, 1917.

(*b*) "Traite des Zoologie Medicale et Agricole." A. Raillet; 2nd edition, 1895; page 772.

(*c*) "Parasites and Parasitic Diseases of the Domesticated Animals." Neumann-MacQueen. 2nd Edition, 1905; page 50.

(*d*) "Medical and Veterinary Entomology." W. Herms. 1915, page 244.

FOREIGN BODIES IN A BULL'S RUMEN.

By W. WALLIS, M.R.C.V.S.
(*Barnet*).

THAT cattle will swallow foreign bodies is well known, but the size and weight of them is often unbelievable unless they are absolutely seen.

A short time ago I was called in to give an opinion upon a bull, which, the owner said, was not "doing well." I diagnosed this to be due to indigestion from the presence of foreign bodies in the digestive tract, but I was hardly prepared for what I found on post-mortem examination. With the owner's consent the animal was destroyed, and the contents of the rumen included two large iron wedges used for splitting wood and a collection of iron bolts, nuts and screws numbering over a hundred. Upon enquiring into the history I found that the owner had been repairing the mansion and premises, and that a barn had been used as a workman's shop in which a lot of carpentering and ironwork repair had been done. The bull had had free access to this barn and had from time to time swallowed the foreign bodies.

URTICARIA IN A COW.

By MAJOR C. G. SAUNDERS, D.S.O., B.V.Sc., M.R.C.V.S.
(*Worthing*).

RESPONDING to an urgent call to visit a cow, whose owner was convinced that she was very seriously ill, but who could give no coherent description of her condition, I found a half-bred Shorthorn cow, lately calved, suffering from a typical case of urticaria. The body, udder, vulva and perinæum being covered with varying sized wheals, no constitutional symptoms and no cause could be found for the attack, as she had been in the pasture with the rest of the herd. A saline purgative restored her to normal, much to the owner's relief.

ORBITAL SINUS.

By J. H. MASON, M.R.C.V.S.
(*Darlington*).

Subject.—Second season foxhound dog.

History.—For several days the left eye had been "discharging," but this was considered by the huntsman to be due to the hound having caught a cold in that member, or to some foreign material adhering to the cornea. No history of a blow in the region of the orbit was given.

Symptoms and Treatment.—A cursory examination led me to think that it was a case of muco-purulent conjunctivitis. The conjunctiva was smooth and congested and the cornea semi-opaque. Photophobia was manifested by half-closed lids and unless a closer inspection had been carried out, the case would have been dismissed with a bottle of eye lotion. However, with no little trouble I discovered what I only half hoped to find—a sinus extending from the inner canthus to about two inches up the frontal bone. It commenced just underneath the upper lid and ran upwards below the skin. As daily treatment was necessary, the case was transferred to hospital.

After fixing the animal and locally anæsthetising the eye and adjacent skin (with " Apothesine "), I passed a probe to the blind end of the sinus and made an incision at that point. With a fine seton needle I introduced a tape and tied it in position, but, unfortunately, the hound pulled this out during the night.

Daily syringing of the sinus with " Eusol " and irrigation of the eye with zinc lotion (4 grs. $ZnSO_4$ to 1 oz. of water) brought about an improvement, but still the discharge did not cease. As the passage showed signs of closing too soon (due to absence of seton), I smeared a piece of tape with " protosil ointment " (a silver nitrate preparation) and introduced it for a few minutes. It had the desired effect of widening the sinus.

About three weeks after admittance to hospital, two small fragments of bone were noticed at the inner canthus and the smaller of these I succeeded in removing at once. The other remained firm and caused the animal some pain when traction was applied, but after allowing three or four days to elapse I successfully removed a sequestion, the area of which was about that of a shilling. It was an elongated fragment, the ends of which were firmly held by the upper and lower lids so that it had to be screwed round before coming away.

The eye now made an uninterrupted recovery : discharge ceased at once : sight was restored and except for a rather drooping upper lid the hound was normal.

This case shows how a minute examination pays ; I might have treated the eye for conjunctivitis for long enough and eventually (with the exfoliation of the fragments) been made to look very small.

FATAL POISONING BY SMALL DOSES OF OIL OF CHENOPODIUM.

By T. G. PRIME, M.R.C.V.S.,
Upper Norwood, S.E.

I HAD until recently looked upon oil of chenopodium as a safe vermicide, but, alas ! find that, like santonine, it is by no means safe any more than absinthe is.

Two cats, aged about seven months, were each given a capsule containing two and a half drops of oil of chenopodium and half-an-hour afterwards a dose of salad oil. In about an hour's time one cat was sick and suffering from abdominal pain and twitching. These symptoms continued at intervals for about eighteen hours, when the cat died. The other cat was sick, suffered from slight abdominal pain and twitching, and remained dull and stupid for three days before recovering its health.

A fox-terrier puppy, aged eight weeks, which was apparently healthy at the time a dose of two and a half drops of oil of chenopodium in a capsule was given, and a small dose of castor oil half-an-hour afterwards, was taken seriously ill half-an-hour afterwards, rolling about and screaming with pain. Eyes rolling and showing a great deal of the whites. At times there were epileptical convulsions, with peaceful intervals. The puppy was very limp and lifeless at times, and gradually the respirations became less frequent and shallow, and the puppy died twelve hours after the dose was given.

The symptoms in both these cases were the same as if an overdose of santonine had been given, the only difference being abdominal pain.

I cannot find a case of fatal poisoning by oil of chenopodium recorded, although there are plenty by santonine.

A NEW VARIETY OF RINGWORM

By ROBERT CRAIK, M.D.,
Glasgow.

A HEALTHY girl, aged 21, had in October, 1916, a skin eruption on her thigh. It began a fortnight before as a small red point which was thought to be a bite, and was now about the size of a shilling and quite suggestive of ringworm. Fine scales showed plenty of mycelium. The source of infection remained unknown. Treatment was soon successful.

Seeded on wort agar fine particles gave good growths. At first grey and semi-transparent, after the sixth day, at room temperature, a white floury centre appeared and spread over most of the culture. In plate cultures this centre, under a low power, was a forest of upstanding, large, rough, multiseptate spindles; and the peripheral zone showed matted mycelium with a smooth surface on which were a few scattered small spindles and a few simple, attentuated, sterile, aerial hyphæ. Under a higher power (16 in.) a slide preparation showed pyriform swelling at the septa in several hyphæ; many large spindles were seen to have 6-9 septa and thick walls conspicuously rough on the outside. Repeated culture on several media at various temperatures gave no material change except in rate of growth.

1. The pyriform swellings at the septa, even in young cultures, are characteristic of microsporon.

2. The floury centre contrasts with the downy centre of *M. audouini.* Microscopically total absence of acladium conidiophores explains

this, for these are abundant on all media in microsporon of the child, and form the white down on its cultures. The multitudes of coarse spindles forming the floury centre are not present in microsporon of the child, which is remarkable for scarcity of little divided spindles.

3. In microsporon of the dog large spindles are fairly numerous, but its cultures also bear numerous acladium conidiophores—one is as important as the other. Under stress of circumstance the new organism has completely scrapped the primitive acladium conidiophore and staked its existence on multilocular spindles, which it produces in countless numbers.

The microsporons are usually regarded as one species, *M. audouini*, with two varieties—*M. audouini* var. *canis* and var. *equinum*. Obviously var. *canis* is only half-way between *M. audouini* and the new variety which deserves the name var. *macrosporium*. This plurality of conidial forms in microsporon, these elaborate multilocular spindles and the constantly hall-marked mycelium, are reminiscent of certain higher ascomycetes. Under pathogenic conditions such forms are never seen. It is to be inferred that such an organism, growing well on ordinary media at ordinary temperatures and passing through a parasitic phase in which development is much restricted, leads a double life in nature for which the conidial forms are designed. —*The Lancet.*

ACUTE GASTRIC INDIGESTION IN A PIG.

By MAJOR C. G. SAUNDERS, D.S.O., B.V.Sc., M.R.C.V.S.
(*Worthing*).

A THREE-MONTH-OLD male pig developed acute symptoms of indigestion very shortly after he had eaten his own share and his three brothers' shares of raw potato peelings. He showed great restlessness, squealing and grunting, with short periods of quiescence, abdomen greatly distended and tense.

Treatment.—Copious enemata of soapsuds emptied the rectum and colon, which gave only slight relief. As it was found impossible, owing to the resistance of the patient, and his apparent inability to swallow, to administer any remedies *per orem*, apomorphine grains $\frac{1}{5}$ was given hypodermically. About ten minutes afterwards the patient was seized with what appeared to be an epileptic fit, sudden unconsciousness, foaming at the mouth, and convulsive movements of the limbs. From this seizure he rapidly recovered, and in few a minutes had a copious evacuation of fæces and flatus, but vomition did not occur. Very shortly after the action of the bowels the patient, who had regained his normal figure, was hunting around for something to eat and making an uneventful recovery.

INVAGINATION OF THE SMALL INTESTINE IN A ROMNEY MARSH RAM AND ITS PROBABLE CAUSE.

By E. MORGAN, M.R.C.V.S., D.V.H.,
Puerto Cabello, Venezuela.

THIS two-year-old imported pedigree sheep had been under my care for several months. It arrived in this country from England last August, along with a few others. Last November the animal suffered a great deal from what we might term "spasm of the bowel," which caused frequent motions. The fæces expelled were a great deal softer than normal. The animal forced so much at times that several inches of the rectum appeared. In spite of all this he continued eating moderately well. He was coughing deeply sometimes, if disturbed. The animal moved with a stiff gait in the hind parts of the body, and at times was quite lame in one of the hind limbs, yet I could not detect anything abnormal throughout the length of the limb. Besides, there was not the least manifestation of pain while I manipulated the limb. Eventually I noticed that he got into the habit of eating the walls of the buildings, which consist chiefly of dried mud. This habit is quite common throughout the interior of the country amongst herbivorous animals, and sometimes amongst human beings. Grown-up children are known to have eaten holes through the walls of their bedrooms. Doctors find it difficult to cure. Perhaps those who chew tobacco can enlighten us on the subject. These persons are pale yellow in colour and anæmic.

As I could not easily prevent the animal from eating these walls and allowing him liberty like the others, I placed him in a loose-box of concrete walls and gave him small quantities daily of pulverised bone to try and counteract the habit of eating abnormal substances, a treatment suggested by Sir Arnold Theiler in Africa. While indoors I found that the animal voided a few worms in the fæces, so I treated him with copper sulphate and gentian, as well as tonics. Also a few enemas of a weak solution of potassium permanganate. In about a fortnight's time I liberated the animal, as he was now eating well, and *the intestinal* spasms had disappeared, as well as the lameness, with the exception of a slight drag on the hind limbs, which continued till death. Although his appetite was good, yet he did not improve proportionately in condition. After the lapse of several months he recently commenced again to eat the walls, as well as earth in the fields. Although the digestion was impaired, the intestinal trouble was not so pronounced as before. One day this week he did not follow the others to the field, but stayed behind in the yard. The following day I noticed these symptoms :—Absence of rumination ; stoppage of the bowel, and hardly any attempts to pass fæces. Although the animal was evidently in pain, yet he was resting without the least outward manifestation of colicky pains. Eyelids half closed and drooping ears. It needed a great deal of persuasion to get him on his feet, and then he would move about a little, but would soon lay himself down again. I should like to emphasise that ruminants *with intestinal obstruction*, as a rule, will only get on their feet by forcing them to do so. This is one of the typical symptoms of "gut tie" in steers. Temperature was only a shade above normal.

Treatment.—I can dismiss with a few words. Gave him a small dose of linseed oil, plus a few drops of tincture of aconite, which he vomited immediately. He expired in about an hour's time. This dose, I think, hurried matters.

Post-mortem Examination.—The large intestine, as well as several feet of the small intestine, were studded with nodules of various sizes from a pea to a walnut, also the mesentery itself to such an extent that there was hardly an inch of the latter without large nodules, which appeared like casefying tubercles [these nodules are said to form ports of entrance for numerous pathologic bacteria—Sub-Editor] of a diseased bovine pleura, with at least one difference, that the contents of these were of a greenish-yellow colour, which contained larvæ of nematode worms, apparently *œsophagostoma Columbianum*, which are often met in the intestines of American sheep and cattle, and make the intestines of slaughtered animals unfit for sausage casings. I have often condemned barrelsful of casings due to these verminous nodules. In this particular case the mesentery and the last part of the intestine were the most highly infected areas. There was an invagination of about ten inches of the small intestine, which was highly inflamed, and the parts were so firmly set in that position that I was obliged to dissect a few inches of the outer invaginating portion before I could withdraw the invaginated portion. The stomach and also the intestine as far back as the invaginated part were full of food, which was of normal consistence, with the exception that it contained a quantity of earth. All other organs appeared healthy.

Remarks.—Two or more conclusions can be drawn from this case, of which either or both might have been the direct or indirect cause of this invagination of the intestine :—(1) The worm nodules. (2) Eating earth. Both of these caused irritation of the intestinal wall. Also the extensive nodules were apt to cause contraction of the intestine at certain areas. Their presence caused spasms of the intestine, with the result of so often expelling its contents that when the contents of the stomach would pass backwards along the almost empty contracted coil and came in contact with these studded areas it was quite easy for the inversion to take place during a spasm.

These worm nodules were undoubtedly the cause of lameness and the stiff gait of the animal. Animals are apt to eat irritant poisonous materials along with the dried mud in these walls.

In a case of *intestinal* obstruction one might ask the question: Why such a vast difference in symptoms between ruminants and equines? Is it due to the difference in size and functions of the two stomachs? Evidently there is less digestion going on in the ruminant's intestine than in the equine's. There is a continuous flow of bile into the intestine of the horse, which helps to explain that the food passes out regularly from the stomach to the intestine. Also the stomach of the horse is too small to retain a large quantity of food, unlike the ruminant's stomach. Also the ruminant, not being a continuous feeder, is supplied with a large gall bladder, so as to store sufficient bile until needed. Intestinal trouble is far more acute in equines than in ruminants.

Translations.

SWINE ERYSIPELAS IN MAN.

By J. SABRAZES and L. MURATEL.

THE authors refer to a case of erysipelas observed in man, due to accidental inoculation at the time of vaccinating swine. The operator accidentally stabbed himself with the needle of a syringe filled with vaccine against erysipelas. The needle was introduced into the index finger of the left hand to a distance of two millimetres. The first symptoms of erysipelas appeared four days later, nothing having been applied at the time, except a spot of tincture of iodine to the site of the inoculation. Bichloride of mercury 1 in 1,000 was now applied and proved very effective, but if the application was suspended for a period erysipelas showed a tendency to reappear. The blood of the lesion sown on special culture media showed no bacilli; it revealed on microscopic examination very rare bacilli of the erysipelas type and contained a larger proportion of white globules than the blood of healthy skin. In the general circulation there was a larger percentage of eosinophile bodies (4.64 per cent.)

Terminating this brief note the authors recommend the systematic use, topically, of the bichloride immediately after the infecting prick, and that the dressing be maintained *in situ* permanently during the whole of the period of incubation, which is about four days.

(This note is interesting in view of the fact that one or two British practitioners have mentioned cases of accidental infection with swine erysipelas.—SUB-EDITOR.).—*Revista Zootechnica.*

G. M.

FOOT AND MOUTH DISEASE IN MEN AND ANIMALS IN OLDENBURG.

BY SCHLÄGER.

SCHLAGER has tabulated the results of the enquiry by the Oldenburg doctors into cases of illness in which the transmission of foot and mouth disease to men has been established. Altogether 60 such cases are mentioned. Severe cases of illness have often been treated in which there was great general disturbance of health and typical signs of the disease in the mouth, on the hands and on the toes, which compels us to a knowledge that the virus of foot and mouth disease can certainly be transmitted to man. Modes of communication are through uncooked milk and also by direct contact with the virus. As proof of the identity of the malady in man and animal inoculating material from sick men has been introduced into experimental animals with positive results. The susceptibility of man to inoculation does not, however, appear to be very great, as during the period under discussion (1920) the disease was notified in over 10,000 holdings.—*Swiss Veterinary Journal.* G. M.

SUBCUTANEOUS INJECTIONS OF SALICYLATE OF SODA.

BY LHOSTE

AFTER remarking on the use of salicylate of soda in the treatment of acute archronic rheumatism, on the inconvenience of its administration by the digestive tract and on the difficulty of its use in veterinary medicine owing to its high price, the author advises its use subcutaneously.

He relates two cases of cure, the one in a cow and the other in a horse, by means of hypodermic injections of the following solution :—

Salicylate of soda	..	30 grains.
Distilled water	..	160 minims.

The injections are repeated for 5 days and at the end of 8 days cure is complete.

Any complication, such as œdema at the point of inoculation, may be easily avoided by using a less concentrated solution. Lhoste suggests the use of this method as a preventive in infectious rheumatism of young animals and in arthritis following abortion and post partum metritis.—*La Presse Medicale.*

G. M.

Abstract.

A NOTE ON SURRA IN CAMELS FOR COMMANDANTS OF CAMEL CORPS.

By H. E. CROSS, M.R.C.V.S., D.V.H., A.Sc.

Treatment.—The treatment with which the best results are obtained is by the intravenous injections of 1 per cent. solution of tartar emetic on alternate days. An average sized camel tolerates the following doses :—

1st day—50 c.c. of a 1% solution.
One day interval.

3rd day—100 c.c. of a 1% solution.
One day interval.

5th day—150 c.c. of a 1% solution.
One day interval.

7th day—150 c.c. of a 1% solution.
One day interval.

9th day—200 c.c. of a 1% solution.
One day interval.

11th day—200 c.c. of a 1% solution.
One day interval.

13th day—200 c.c. of a 1% solution.
One day interval.

15th day—200 c.c. of a 1% solution.
One day interval.

17th day—200 c.c. of a 1% solution.
One day interval.

19th day—200 c.c. of a 1% solution.
One day interval.

21st day—200 c.c. of a 1% solution.
One day interval.

23rd day—200 c.c. of a 1% solution.
One day interval.

25th day—200 c.c. of a 1% solution.
One day interval.

27th day—200 c.c. of a 1% solution.
One day interval.

29th day—200 c.c. of a 1% solution.
One day interval.

31st day—200 c.c. of a 1% solution.

The first injection should be given when trypanosomes are absent from the peripheral circulation and the temperature is low; if the drug is injected during a paroxysm, fainting and in some cases even death may result from comparatively small doses, *e.g.*, 50 c.c. of a 1 per cent. solution; but if the injection is made when the peripheral circulation is free from trypanosomes, doses up to 200 c.c. of a 1 per cent. solution are usually well tolerated.

The tartar emetic should be dissolved in distilled water; the solution filtered and injected very slowly at blood heat. Freshly prepared solutions must always be used.

The most suitable apparatus is Ehrlich's injection flask, fitted with indiarubber tube, glass tube and needle.

If any of the solution is injected subcutaneously swelling and suppuration will result.

When the needle enters the vein the blood will be seen in tube A. The dose of tartar emetic is then poured into the flask B. The indiarubber tube must now be squeezed to get rid of any air. The solution is allowed to flow into the blood stream, and when nearly the whole of dose has entered the blood a little normal salt solution is poured into the flask B and allowed to flow into the blood stream, the needle being then withdrawn.

If no salt solution is injected after the tartar emetic a drop of the latter may enter the tissues when withdrawing the needle, resulting in suppuration and swelling, but by the injection of a small quantity of salt solution after the tartar emetic this danger is avoided.

If after any injection the camel is off feed no further injection should be given till the camel is again feeding well, and the next dose should be slightly decreased. If the decreased dose is well tolerated, a full dose may then be given at the next injection.

The doses must therefore be regulated in accordance to the manner in which camel is "standing" the injections.

The best way to determine how the camel is "standing" the injection is to note how the animal feeds. The injections should be made in the afternoon. The camel should be fed in the morning with a small quantity of grain, then sent out for exercise or browsing, and again fed with grain and bhoosa in the evening. Water should be allowed *ad lib.*

During the course of the treatment, if the camel becomes constipated he must be treated with Epsom salts, in doses of 1½ to 2 lbs. Sometimes diarrhœa (occasionally bloody diarrhœa) results from the injections of tartar emetic. In such cases 2 to 3 ozs. of chlorodyne or camphorodyne should be given, and no further injection should be given till the condition of the bowels is normal. In some camels quivering of the muscles of the hindquarters a few hours after the injections is given is observed, but this symptom disappears after a few hours and needs no special treatment.—From the REPORT OF THE DIRECTOR OF AGRICULTURE, PUNJAB.

AUSTRALASIAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

THE fifteenth meeting of the Australasian Association for the Advancement of Science was held at the University, Melbourne, during the week commencing January 10, 1921.

Though these meetings generally are held every two years, owing to the war and the impossibility of gathering scientists together a period of seven years had elapsed since the last meeting.

During this time, however, the parent Society—the British Association—held a meeting in Australia in 1914. The present meeting was to have been held in Hobart, Tasmania, but, owing to the shipping difficulties consequent on a strike, it had at the last moment to be transferred to Melbourne.

As with the parent Association, all branches of science are represented, there being in all thirteen sections. Previously veterinary science had occupied a sub-section of agriculture, but to veterinary science has now been allocated a full section.

The officers of this section were:—President, Professor H. A. Woodruff (Melbourne); vice-presidents, Professor J. Douglas Stewart (Sydney), Dr. J. A. Gilruth (Melbourne), and Mr. Max Henry, B.V.Sc. (Sydney); committee, Dr. W. T. Kendall, Messrs. W. A. N. Robertson and C. N. Meyers; secretary, Mr. T. Philip, L.V.Sc., Hobart, who carried out the initial organisation, but owing to his inability to come to Melbourne Dr. H. R. Seddon subsequently undertook his duties.

The Congress as a whole was very well attended, and thoroughly successful.

Naturally, owing to the sudden transfer to Melbourne, it was not possible to arrange as many excursions as might have been wished. The Section of Veterinary Science was very well attended, not only by veterinarians resident in the State of Victoria, but also by a number from New South Wales and South Australia. All members, however, are eligible to attend the meetings of any of the sections, and this privilege was freely availed of by veterinarians, especially when somewhat allied subjects were being dealt with in other sections.

For his presidential address, Professor Woodruff took as his subject "The Development of the Present Conception of Immunity."

Joint discussions were held with the Agricultural and Sanitary Science Sections on "The Repression of Animal Tuberculosis," the subject being opened by Professor Douglas Stewart; another subject discussed (with the Biological and Agricultural Sections) was "The Present Position of Theories of Heredity," the subject being opened by Professor W. E. Agar.

Members of the Section also discussed "The Prevalence of Contagious Diseases in Australia and the Danger of Introduction from Abroad."

A joint discussion was also held with the Sanitary Science Section on "Milk Production" and "Meat Inspection," the subjects being opened by Mr. W. A. N. Robertson (C.V.O., Melbourne) and Mr. Max Henry (Government Veterinary Officer, Sydney) respectively.

Papers were contributed by Mr. G. G. Heslop, M.V.Sc., D.V.H., on "Researches into the Serological Diagnosis of Pleuro-pneumonia in Cattle"; Mr. F. E. Place, B.Sc., M.R.C.V.S., on "Milk Vitamines in Diet Deficiency Diseases in Live Stock;" and Dr. H. R. Seddon on

"The Problem of Abortion Disease of Bovines" and "A Record of the Occurrence of Bacillary White Diarrhœa of Chicks in Australia."

Owing to the non-receipt of another paper (due to shipping disorganisation) Dr. J. A. Gilruth kindly came forward and addressed the Section on "The Methods of Control and Eradication of Ticks in U.S.A. and their Applicability in Australia."

It will be seen from the above that the subjects brought forward were sufficiently comprehensive to interest members in every field of veterinary science. Admirable discussions resulted, and everyone felt the benefits of such a meeting, which allowed not only a free exchange of ideas, but the making (or renewing) of friendships with veterinarians from the other States, so helping to weld together the profession in Australia.

Parliamentary.

STATUTORY RULES AND ORDERS,

1921, No. 42.

MINES.

Coal Mines.

ORDER OF THE BOARD OF TRADE, DATED JANUARY 1, 1921, UNDER SCHEDULE 3 TO THE COAL MINES ACT, 1911 (1 & 2 GEO. V, C. 50), PRESCRIBING MANNER OF TESTING HORSES FOR GLANDERS BEFORE BEING TAKEN UNDERGROUND.

In pursuance of the Third Schedule to the Coal Mines Act, 1911, and of the provisions of the Mining Industry Act, 1920, (*a*) the Board of Trade hereby prescribe that horses before being taken underground shall be tested (*b*) for glanders by a duly qualified veterinary surgeon in the following manner :—

(1) The test shall consist of the hypodermic injection of mallein, followed by the taking of the temperature of the animal at the 6th, 9th, 12th, 15th and 20th hours respectively after the injection, but may be combined with any supplementary test.

(2) The animal to be tested shall rest for 24 hours before the test is applied.

(3) The physiological variation of the animal's temperature shall be noted before the test is applied.

(4) The test shall not be applied to any animal while showing an abnormal temperature.

(5) The animal shall not be worked for a period of 30 hours after the injection.

(6) The test shall not be applied to any animal which, after making reasonable inquiry, the veterinary surgeon knows to have received a mallein injection within the preceding month.

(7) The mallein used for the test shall be obtained from the Royal Veterinary College, and shall be used in the dose specified by the College.

The Order dated May 17, 1912, (*c*) made by the Secretary of State in pursuance of the Third Schedule to the Act is hereby revoked.

W. C. BRIDGEMAN,
Secretary for Mines.

Mines Department,
Victoria Street, S.W.1.
January 1, 1921.

NOTICES.

All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C.2. Telephone: Gerrard 4646. Telegrams: "Baillière Rand, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editor.

Manuscript—preferably typewritten—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown ink on white paper or card.

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THE

VETERINARY JOURNAL

Editor:

FREDERICK HOBDAY, C.M.G., F.R.C.V.S., F.R.S.E.,

HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING.
OFFICIER DU MERITE AGRICOLE (FRANCE).
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Sub-Editor:

GLADSTONE MAYALL, M.R.C.V.S

AUGUST, 1921.

Editorials.

A NEW APPLICATION OF THE STOMACH TUBE FOR DIAGNOSIS.

THANKS largely to the perseverance of Mr. M. W. Lang, M.R.C.V.S., who has devoted much time and thought to the subject and given demonstrations before numerous societies, the use of the stomach tube has now become general in the hands of a number of practitioners, and its utility in certain classes of case cannot be denied. In the present issue, however, further pioneer work is reported from India in its use as a diagnostic agent for certain parasites of the stomach—in this case for the early diagnosis of *Habronemiasis*, and we cannot but congratulate Major R. Hodgkins, D.S.O., M.R.C.V.S., on the happy thought which led him to try an idea which has been followed by such good results. In a disease of this kind, early diagnosis is of the utmost value, and, as the method is a simple one and quite easy to apply, we are sure that it will be much appreciated and followed out, not only by our British colleagues, but also by our Continental *confrères* when practising in colonies which have in them patients suffering from this troublesome infection of the horse.

OUR POST-MORTEM OPPORTUNITIES.

Recently some striking headlines have appeared in certain sections of the public press asserting that mistakes of diagnosis occur in human medical practice in as high a proportion as 80 per cent., and that the remedy lies in the right of the doctor to demand a post-mortem examination. The proportion is exaggerated, but that mistakes of diagnosis do occur is a fact which is only too obvious even to the man in the street, especially since the panel system has come into vogue. To be proud of having disposed of so many patients in an hour denotes a want of care in diagnosis which is eventually going to reflect unfavourably on the health of the nation, and it is questionable whether those who run this class of practice would look with favour upon the idea of universal *post-mortems*. To the real student, however, and every medical man *should* be a student all his life, the opportunity of a *post-mortem* would be snatched at eagerly as a means of acquiring knowledge. Similarly with our profession ; when we take the trouble to *post-mortem* an interesting case—how often do we find a condition of affairs which totally contradicts [the diagnosis made in life ? *Post-mortems* are educations in themselves, and we in the Veterinary profession have, in the facility with which we can obtain them on our patients, a very great advantage over our medical *confrères*. Alas, how few of us make use of our opportunities in this direction !

THE COMPARATIVE ASPECT OF ACTINOMYCOSIS.

In another column we publish an abstract of a paper which has recently been published in the *Lancet* on the treatment of Actinomycosis in human patients, and it is interesting to be again reminded of the fact that the treatment by the administration of iodide of potassium internally does not meet with the high proportion of success in man which accompanies its use in the treatment of this disease in cattle. The author advocates surgical measures, accompanied by the injection of a vaccine, and it may be worth while to consider this method of application to those of our patients who do not respond to potassium iodide. The proportion of these is not high, but every now and again the practitioner meets with such cases, and occasionally in a pedigree beast of great value. The paper is well worth perusal, even if only looked upon from the comparative aspect, as showing the respective varieties of method adopted by the human and the veterinary surgeons for the treatment of a disease which has a common origin in man and animals.

General Articles.

THE PREVENTION OF TUBERCULOSIS IN CATTLE.

By NATHAN RAW, C.M.G., M.D., M.P.,
(*President of the Tuberculosis Society of Great Britain and Ireland.*)

ONE of the most urgent problems of the day is, undoubtedly, the eradication of tuberculosis from dairy cows.

Not only from the point of view of having healthy, tubercle-free cattle, but on account of the immense influence on public health.

It is now settled beyond all doubt that a very large amount of tuberculosis is conveyed to children and young adults by means of milk from cows suffering from tuberculosis of the udder, and how much is conveyed by meat, butter, and cheese is not yet definitely determined.

It is estimated that a million dairy cows in Great Britain are at present affected with tuberculosis, of which about 5 per cent. are affected in the udder, rendering these cows extremely dangerous to the public health.

If all these cattle were destroyed to-morrow, and full compensation given to the owners, it would not solve the problem, as another generation of calves is coming on, many of them already infected, either by living in contact with their mothers, or infected in the early weeks or months of life by drinking the milk of a tuberculous cow.

The only solution to the problem is *prevention of infection.*

It cannot be too strongly emphasised that calves are born healthy and quite free from tuberculosis. They may easily be infected if not separated from diseased animals, or if they are fed with milk containing tubercle bacilli.

The only cause of this disease is the tubercle bacillus, and it is invariably conveyed either to man or animals from without, viz., by Inhalation, Ingestion, or Wounds of the skin.

We recognise three types of tubercle bacilli, all originally of a common species, and, developing from a long residence in certain animals or man, certain characteristics which they have retained :

1. Human.
2. Bovine.
3. Avian.

The Human Type causes pulmonary tuberculosis or consumption in man, and is not easily conveyable to cattle.

The Bovine Type attacks cattle, pigs, and horses, but very rarely sheep or goats, and never dogs.

The Avian Type attacks birds, poultry and fishes.

The Avian type cannot be conveyed either to animals or man, and, therefore, can be disregarded so far as causing the disease in the human

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The Avian type cannot be conveyed either to animals or man, and, therefore, can be disregarded so far as causing the disease in the human is concerned, but the Bovine type is easily conveyable both to animals and man, and is, therefore, a great danger to the public.

For this reason it is imperative to do all in our power to eradicate the disease from dairy cows, if we are to prevent a never-ending supply of tuberculosis from animals to man.

An enormous amount of work has been done all over the world in the attempt to immunise cattle against tuberculosis.

Von Behring inoculated a large number of cattle with human bacilli and produced an immunity lasting from six months to a year, but this work was not conclusive.

Bang, of Copenhagen, believed in strict segregation, and Nocard did a lot of work on the same lines. Calmette, of Lille, has just published a record of cases in cattle in which he shows the possibility of immunising young cattle by injections of bovine bacilli.

I came to the conclusion in 1906 that we could not expect to get good results either in immunity or in the treatment of the disease by using virulent bacilli, and for that reason I decided to attempt to alternate the bacilli, so as to render them safe for use by long continued subculture.

The only certain way of permanently attenuating virulent cultures of tubercle bacilli is by long-continued and systematic subculturing spread over a number of years.

In 1906 Professor Koch gave me in Berlin a pure culture on glycerine agar of human bacilli from the sputum of an advanced case of pulmonary tuberculosis. Professor Calmette supplied me with a pure culture of bovine tuberculosis obtained from the mesenteric glands of a cow, and Professor Bang, of Copenhagen, gave me a pure culture of Avian bacilli from the liver of a chicken.

These cultures have been subcultured on glycerin potato and then transferred to glycerine agar every month for fifteen years in my laboratory, and the present growths represent the 184th generation.

The growths are still profuse and true to type, but they are quite non-tuberculogenic and completely non-pathogenic to animals.

Every year since 1906 I have injected these bacilli into animals with a view to testing their pathogenicity. Until the year 1912, that is the 84th generation of subcultures, I noticed no change in their virulence. After that time attenuation became marked, and in a series of animal inoculations of these bacilli in 1913 and 1914, they were observed to be avirulent.

These experiments, which have occupied me for fifteen years, conclusively prove that virulent tubercle bacilli can be attenuated to such a degree as to be avirulent and non-pathogenic to highly susceptible animals, and, in my opinion, we have in our hands a remedy against tuberculosis which will be of the greatest value, not only in the cure of the disease, but what is of still greater importance, in its prevention, by protecting the animal against infection.

If we can produce some immunity by artificial means, either in man or animals, sufficient to enable them to resist infection, we will have gone a long way towards stamping out tuberculosis.

The vaccine which I have prepared from these attenuated cultures is a bacillary emulsion of the bacilli and contains all the products of the bacillus. Living cultures are not used for this purpose.

For the purpose of immunising calves, they should be separated from the mother at birth, and fed on healthy milk or the pasteurised milk of the mother for a week, when the first dose of vaccine is given, followed in another two weeks by the second dose of vaccine.

The vaccine is given hypodermically in the usual way with strict aseptic precautions, under the skin of the abdomen.

It may be possible to use the vaccine for the purpose of treating those animals already infected, but of this I have no experience, and it cannot be too strongly emphasised that the treatment I advocate is only of value in non-infected animals.

The question is of such immense importance to the rising generation of children that it is our duty to adopt every means possible to stamp out tuberculosis in cattle.

BACILLUS COLI INFECTIONS IN THE NEW-BORN FOAL.

By S. H. GAIGER, F.R.C.V.S.,
and
THOS. DALLING, M.R.C.V.S.,
(*Animal Diseases Research Laboratory, Glasgow Veterinary College.*)

THE following cases are placed upon record together with a discussion upon them in the hope of guiding practitioners along these lines of observation, and inducing them to record how far these ideas fit in with what they constantly meet in practice.

I.

The mare, a Clydesdale mare, was at one time a prize winner. She had her first foal in 1912 and had had in all eight foals numbered (1) to (8) below. Her dam, still alive, has had eight foals but none of those became affected with joint-ill.

Foal (1) when born, lay for twelve days, sleeping most of the time, and was not expected to live. On several occasions it seemed dead when disturbed to receive its small regular diets of milk. There was no abnormality about the legs. The foal recovered, never showed lameness and lived a number of years.

Foal (2) was born in April. It died in 24 hours. There was no abnormality of the joints. It had sucked well in the first hours of its life.

Foal (3) was born in April. It died at three months old. It never showed any lameness. It was affected with scour from the age of one month. It was treated, but without avail.

Foal (4) lived. Was sold as a gelding later.

Foal (5) was born in March. It had scour for three days when ten days old. Recovered and took prizes.

Foal (6) was born in April; never had a day's illness, recovered and took prizes.

Foal (7) was born in March. It died at the age of three weeks. It suffered from indigestion and scour for seven days, when the joints and limbs became swollen and the foal went lame. The navel was properly healed. It was treated for scour without success. Treated for joint-ill with antistreptococcic vaccine but without improvement.

Of the above seven foals five were fillies and two were colts.

Foal (8) was the only one dealt with at this Institution. The foal was due on March 24 but was born on April 10 at 11 p.m. It was a foal of immense size and great quality. When born it lay and groaned for about two hours before it got on its feet, when apparently it became all right and was quite lively. It would not lay hold of the teats and suck properly, though it seemed a strong foal and was making plenty of vigorous efforts to suck. The foal was taught to suck upon the evening of April 11, at which time it was perfectly normal and showed no signs of lameness. The temperature was 101.2, pulse 120. The navel string was normal and tied. The foal was housed in a scrupulously clean large loose-box, specially prepared, and treated with lime and carbolic acid. Half an ounce of castor oil was given at 8 p.m.

On April 12, at 3.30 a.m. the foal was seen by the owner. It was all right and frisking round the loose-box. At 5 a.m. the foal was noticed lame, the near-hind fetlock was badly swollen, and by noon both fore fetlocks similarly affected, then, an hour later, both knees. The fetlock joints were very painful to the touch, the foal lay most of the time groaning, and seemed in great agony before death, which occurred at 2 p.m. on April 12.

The limbs were removed at once and sent to the College.

The mare at this period showed no sign of any ailment. She was always a heavy milker.

Bacteriological Study.—All four limbs were received for examination. All the joints were purulent, and the pus was thick, though able to run, in all joints, except in the hock, where it is better described as purulent synovia. The tendon sheaths were also purulent.

The pus contained large numbers of short bacilli, varying somewhat in length. The shortest forms were almost coccoid, the longest forms reminded one of the pathogenic anaerobes in so far as size went, while many of the organisms showed up much more deeply stained at their ends. Very large numbers of the organisms, including all the forms mentioned, were inside phagocytes, one might almost say the majority were phagocytosed. Long experience of work with bacilli of the coli type enabled one to venture a confident opinion that cultural work would yield pure cultures of the coli type.

An excellent growth was obtained in 24 hours on agar, blood-agar, and bouillon, and also in anaerobic culture, and on plate cultures. In all cultures the organism was pure and was of the coli type, morphologically and culturally. It was gram negative, motile, with the characteristic coli-motility. Gelatin was not liquefied.

Fermented.	*Did not Ferment.*
Glucose.	Saccharose.
Lactose.	Dulcite.
Mannite.	Adonite.
	Inulin.

In litmus milk there was, up to three days, formation of acid but no clot. Cultures were shewn to be pure by plating out. They were tested for sporulating anaerobes by heating three-day anaerobic cultures, but no anaerobes were found to be present.

It was concluded that this case was one of pure coli infection.

Pathogenicity of culture.—A rabbit was inoculated intra-peritoneally with 5 cc. 24-hours' first subculture, but without fatal effect. The rabbit was dull and off its food for a few days and then recovered.

Test of the mare's milk.—The milk was withdrawn with aseptic precautions and a pipette inoculated on to agar plates, but no growth resulted on inoculation.

The owner was unwilling to have the mare's blood withdrawn for the agglutination test with the foal's bacillus.

II.

In this case the same amount of particulars were not forthcoming.

As in I the foal would have been a valuable one. The mare was the mother of at least one prize winner.

The foal was born at 9 o'clock on a certain day in April and died 47 hours later. It was "weakly" to begin with, and did not suck till 15 hours after birth. It only took three or four other drinks altogether, went down and became unable to rise, began groaning from pain and died.

Sent whole to the College for examination.

Post-mortem examination.—The stomach showed acute gastritis. The liver was in a state of cloudy swelling. None of the joints contained thick pus, but a gummy synovia which was very cloudy and in excess.

Bacteriological work.—One stifle joint, one hock, and two fetlocks, all on different limbs were dealt with. Cultures were made aerobically on agar and blood agar, and on anaerobic media. Smears were made in each instance.

The microscopical examination gave identical appearances to those described in I, phagocytosis being pronounced, as before.

Cultural work.—Pure growth in all the tubes of B. coli. Motility of organism more marked than in I. Plate culture did not reveal any impurity aerobically. No sporulating anaerobe found on heating 3-day anaerobic cultures and subculturing.

Did not liquefy gelatin.

Litmus milk, in three days, acid and no clot.

Fermented.	*Did not Ferment.*
Glucose.	Saccharose.
Lactose.	Dulcite.
Mannite.	Adonite.
	Inulin.

Concluded this foal died from a pure coli infection.

Pathogenicity of culture.—A rabbit was inoculated intraperitoneally with 5 cc. 24-hours' primary culture of B. coli from one of the joints mentioned, on March 26. It died on May 17. There was a local ulcer where the needle passed in. The subcutaneous tissues were much discoloured and there was a purulent lymphatic vessel leading from a purulent lymph gland in the right groin. The pus was very thick and white, and swarming with organisms of the coli type. The liver was much enlarged and smears revealed an amazing number of colon bacilli. The blood, too, was swarming with the same organism. Cultures were pure B. coli.

Blood from the mare was asked for and a sterile bottle provided, but only two drops were sent, insufficient to test the agglutinative power of her serum upon the foal's organism.

Test of the mare's milk.—The milk was drawn into a sterile bottle. It yielded no growth of B. coli, but some colonies of staphylococci, which organisms probably gained entrance when the milk was drawn.

III.

The mare was newly purchased and no history of her previous foals was forthcoming.

The foal was not sent to the College as a joint-ill case, but merely with a request for an opinion on the cause of death.

The foal was born in May. It died when 24 hours old. The *post-mortem* examination was made the following day, but the carcase was in a surprising state of decomposition.

Post-mortem examination.—Externally there was nothing abnormal.

The joints, on opening, showed nothing abnormal, there being a quite normal amount of synovia present.

The peritoneal fluid was in excess and tinted with hæmoglobin.

The liver was much enlarged, dark in colour and very friable.

The spleen was dark and petechiated.

The kidneys were in a state of cloudy swelling and showed ecchymoses.

The villous portion of the stomach was acutely inflamed.

The lungs were inflamed and showing ecchymoses.

The serous membranes were ecchymosed.

There was hæmorrhagic endocarditis.

The endothelium of the vessels was bloodstained.

Microscopical examination of smears from the liver tissue showed short bacilli with all the appearances of the colon bacilli described in I, and phagocytosed in enormous numbers by polymorphonuclear leucocytes. There were numbers of organisms of the Vibrion septique type, these not being phagocytosed.

Examination of the mare's milk.—Along with the foal, the practitioner sent a sample of the mare's milk properly collected in a sterile bottle with the information that the mammary gland was indurated. This " milk " was of the appearance of cloudy gum and was so thick it would not run out of the bottle.

Agar and blood-agar tubes were inoculated. Agar yielded no growth. Blood agar yielded several colonies like streptococcus growths. These grew well in subculture on agar and blood agar and formed long chains of streptococci in blood bouillon.

A rabbit was inoculated subcutaneously with 2.5 cc. 24-hours' blood bouillon culture of this streptococcus, on May 6, 1921, and was dead on May 7. Death was due to a septicæmic infection.

Mare's serum properly drawn in a sterile bottle from the jugular vein was tested upon the colon organism of II, but without agglutinating it.

Vaginal swab from mare properly taken with a speculum did not give a coli growth but only Staphylococcus pyogenes aureus and albus.

IV.

This case was seen while visiting a practitioner in the east of Scotland. The foal died at the moment of our arrival at the farm and was dealt with immediately.

The mare gave birth to this, its first foal, at 9 p.m. on a certain day in May.

The foal died 41 hours after birth.

It did not suck at all the first night. When taught to suck it only played with the teat and took nothing. It was not noticed to be lame.

It was never able to lie down properly, although a strong foal, and always let itself fall over on its side in order to lie down.

The carcase was dealt with immediately.

Post-mortem examination.—Liver much enlarged. Peritoneal cavity, organs, and bowels, normal. The stomach normal in appearance from the peritoneal surface, but showing bright red inflammation of the mucous membrane on being opened. Chest cavity normal.

No sign of joint lesions in the uncut limbs. Two fore-limbs were removed and dealt with bacteriologically the same evening. A portion of liver was taken in a sterile tube.

Bacteriological work.—There was a considerable amount of thick, purulent synovia in one knee and in the tendon sheaths of the other leg in the fetlock region.

Smears from this synovia showed the appearances described in I, phagocytosed bacilli predominating.

Cultures were made aerobically on agar, blood agar and bouillon and on anaerobic media from the purulent synovia and from the liver.

All cultures were positive, the B. coli growing in pure culture. Tests as before showed the organism to be pure aerobically and to be free of sporulating anaerobes.

As before, all the well-known reactions of the B. coli were given, but there was a variation in the sugar fermentation results in this instance.

Fermented.	*Did not Ferment.*
Glucose.	Inosite.
Lactose.	
Saccharose.	
Mannite.	
Dulcite.	
Adonite.	
Sorbite.	
Inulin.	

Litmus milk clotted in 24 hours.

Conversations with practitioners from different parts of the country show that all of them have had a number of cases of foals dying within the first three days after birth from symptoms such as have been described above, and that where post-mortem examinations have been made no kidney lesions have been found as would be the case with a B. nephritidis equi infection.

It is interesting to note in I, above, that of the mare's eight foals only four lived. Of the four which died, two died very shortly after birth—one in 24 hours and one in 38 hours,—the third became affected with scour when two weeks old and died at the age of three weeks, the fourth became affected with scour at one month old and died at the age of three months. Of the four which lived one had some kind of toxic infection from birth till 12 days old, was well cared for and recovered ; the second had scour from the seventh day but recovered ; the other two were reared without trouble. Only two out of eight foals really escaped infection. The scours from which the foals suffered were spoken of as " white scours." It is not taking too much for granted, in view of what we now know of such infections, to assume that the scour conditions were due to the action of the colon bacillus. In all the six foals only two would have been termed " joint-ill " cases by the owner or practitioner. It is reasonable to conclude that this mare is a carrier of a particularly virulent strain of colon organism. If the foal receives this organism during birth or as soon as born, death may occur in a day or two—Foals (2) and (8), or a septicæmic condition may result in recovery—Foal (1). If the foal becomes affected at a week old—Foal (7), the course of the affection is not so acute and scour may set in, with death at the age of three weeks, or recovery as in Foal (5), or if infection takes place at a month old—Foal (3), the resulting scour may not kill till the foal is three months old. Infection may not take place at all—Foals (4) and (6).

Where does the mare carry infection ? It must be either in the milk, or the uterus and vagina, or the intestine and fæces. The milk of the mare in I, II, and III was shown not to harbour the B. coli. A colon organism of such virulence could hardly be present in the uterus of a pregnant mare without causing abortion from metritis, and probably the presence of the organism high up the vaginal passage would lead to a similar result. The writers have shown in the case of lamb dysentery that the causal organism—a bacillus of the coli type—can be carried in the intestine of the ewe. It would appear then as if the colon organism, which sets up the disease in foals, is probably carried in the intestine of the mare. The bacillus could be obtained by the foal from the vulval region during birth. Foals make swallowing and sucking movements during birth before they have breathed. They may also get the infection from the external parts of the mammary gland and teats.

What might be done to prevent infection ? This raises the much-discussed question of the respective merits of treatment of the mare and treatment of the foal, also serum treatment for either or both, or vaccine treatment for either or both, or serum and vaccine treatment for either or both. In the writer's view, the line of treatment should depend upon whether the mare is in her first pregnancy or a subsequent one. One should aim at having the foal born with as much immunity as possible.

If the foal is to be the mare's first one, it is obvious that the practitioner cannot know whether the foal, which is a valuable one and must have everything possible done to save it, is likely to contract a streptococcic or a coli infection (leaving B. nephritidis equi out of account). Shall the practitioner inoculate the pregnant mare, and, if so, what shall he inject ? In our opinion inoculation of the pregnant mare must aid in preventing infection of the foal by causing it to be born with a certain amount of immunity, and that this can be taken advantage of and quickly strengthened by further inoculations when the foal is born. We do not advocate inoculation of the pregnant mare to prevent intra-uterine infection because we do not think that this occurs, except in a small proportion of cases and probably not in any caused by B. coli, the streptococcus, or B. nephritidis equi.

Whichever the injection is it must be from a coli and a streptococci source. It should be a vaccine, and it must be a mixed vaccine from organisms obtained from a number of such infections in foals. One dose will hardly be sufficient. The writers would suggest not less than two doses, and preferably three doses at two months to one month before the foal is expected. If a serum is to be used upon the mare, it must be anti-coli as well as anti-streptococcic. The difficulty is to judge when the serum dose should be given. The ideal would be to give it a few days before the birth of the foal. One might be lucky and just hit this off, but in many cases one would not have this luck. Every extra day after the third or fourth would mean that more serum would be eliminated and protection be lessened. Of course one could give a dose of serum every few days after the first dose until parturition, but that adds to expense. The dose of serum must necessarily be a very large one because the foal can only get a fraction of the antibodies injected into the mare, the rest being distributed in the mare's system where it is not required.

Immunity of the foal derived from its mother can only be of a passive nature and therefore does not last long, so that as soon as the foal is born it should receive anti-coli and anti-streptococcic serum injected simultaneously with vaccine from the B. coli and the streptococcus, followed a week later by mixed vaccine alone.

A similar course would be pursued in mares at their second or third, etc., pregnancies, provided the previous foal or foals had remained healthy.

If a mare has had a foal with a septicæmic or joint infection the practitioner should do his best to decide what the nature of the infection is. The best method of doing this is to send a leg from the dead foal to a laboratory for examination. He should impress upon the owner that the foal will probably die, and that the moment it does so a fore-limb is to be removed between knee and elbow and despatched *at once* so as to arrive at the laboratory in as short a time as possible. By doing this, cultures can be obtained to vaccinate the mare during her next pregnancy and so protect the next foal against a like thing happening again. This is the nearest thing which can be done to having an autogenous vaccine for the next foal's benefit. Failing this, the practitioner should make a thorough post-mortem examination and try to decide for himself what the nature of the causal organism is, remembering the following points :—

Bacillus coli.—Foal taken ill a day or two after birth and dead in a matter of 24 or 36 hours. Clinically a septicæmia. The lining membrane of the stomach shows a bright red inflammation showing where infection originated.

The liver is enlarged and friable. The navel is probably quite normal. Joints may or may not show enlargements. Synovia cloudy or purulent. Otherwise the cause of death may be from scour.

B. nephritidis equi.—Foal taken ill a day or two after birth and dead in a matter of 24 or 36 hours. Clinically a septicæmia. In the kidneys are found diagnostic lesions. Kidneys enlarged, filled with blood, capsules easily stripped. On section the glomeruli show as small purulent spots in the cortex only just visible to the naked eye or $\frac{1}{8}''$ in diameter. The liver may be enlarged. Navel probably quite normal. Joints may or may not show enlargements, depending on how long the foal lives. Synovia purulent or discoloured.

Streptococcus.—Taken ill when aged twelve days or more and died after a comparatively long illness of perhaps three weeks. Joint lesions more advanced and extensive owing to longer survival. Navel may be still unhealed.

Having made up his mind as to the cause of death in the foal, the practitioner can make his own decision as to what vaccine he will use on the mare during her next pregnancy, and vaccine and serum on the foal in accordance with the plan already outlined.

In the case under III, above, death was probably due to a double infection of B. coli and the Vibrion septique, the latter having penetrated from the stomach along with the former, the additional lesions being due to the Vibrion septique. It was, in this instance, not a case of post-mortem invasion and decomposition one was dealing with.

It will be noticed in I and II that the fermentation reactions are exactly similar, whereas in IV these reactions were different. The occurrence of such a close similarity between the organisms of I and II may suggest to some that perhaps their agglutination reactions might be identical, and that the agglutination test could be used to show whether a pregnant mare is a carrier of a virulent type of colon bacillus or not. By such a means it might have been possible to detect and treat mares whose foals would be especially liable to infection. In the case of coli infections it is highly improbable that such a test would give results of any value, for, as has been shown by Mackie, however closely strains of B. coli may resemble one another in fermentation and other tests, the serum from any particular strain is very highly specific for that strain in agglutination and complement fixation.

The writers are of opinion that if practitioners would work upon these lines, a great deal more success would attend their efforts against infection in young foals. Practitioners might do more than they do in recording the histories of the sire and dam in such cases. Why, for instance, are the foals of certain stallions so liable to such infections ?

Everything depends upon a knowledge of which bacterium is at work. Much discredit has fallen upon anti-streptococcic serum because it has been used to try and save foals suffering from a pure coli infection. Bear in mind that human beings can be successfully vaccinated against typhoid, dysentery, cholera, and plague all in the same syringe. Do not expect the effect of a serum to last more than ten days. It is unfortunately true that a serum or vaccine may too often be itself to blame. Till we have a reliable serum institute in this country for such purposes we cannot expect it otherwise.

Those who believe that serum and vaccines in such cases are to be disregarded in favour of treatment of the umbilical cord, offer no opinion as to how coli infections via the mouth are to be combated, though perhaps 25 per cent. of such cases are of that nature.

Our thanks are due to Mr. Walter Gardner, M.R.C.V.S., for his care in collecting details in connection with the mare and foals described under I.

SOME OF THE USES OF FORMALIN.

By DAVID IMRIE. M.R.C.V.S.
(*Professor of Surgery, the Veterinary College, Glasgow.*)

These remarks are largely the outcome of a number of inquiries and requests for further information regarding the therapeutic use of formalin received since the appearance of Mr. Lang's article in a recent issue of the Veterinary Journal. Formalin has for a long period been employed by the writer in the treatment of a few diseases with satisfactory results, but since the adoption of the stomach tube method of administration about eighteen months ago, it has been possible to give much larger doses in sufficient dilution, and its employment has been greatly extended.

Actions and Uses.—It is an antiseptic, a disinfectant, a deodorant, but a strong irritant, and when given internally it must be largely diluted. It appears to stimulate the secretions of the gastro-intestinal tract slightly with laxative results, and is employed in cases where an internal antiseptic is indicated—*e.g.*, disorders and diseases of the alimentary canal, toxæmia due to absorption of toxins from the alimentary tract, or from suppurating foci in the bowel or some other part of the body.

Dose.—Two drachms to one ounce may be repeated two or three times a day. The smaller dose may be given orally in the form of a drench ; intravenously in ten ounces of water at blood heat—care being taken to prevent any of the solution reaching the subcutaneous connective tissues—or mixed with the food. The larger dose should be given by the stomach tube.

Formalin is often combined with other agents, such as normal saline solution, nux vomica, and chloral hydrate. The satisfactory results obtained from its use are in some instances probably due in great part to the substances with which it is combined.

Externally.—It is employed in dilution to meet the case, and has been found a safe, efficient, and economical dressing for wounds of all kinds ; helpful in the treatment of canker of the horse's foot, conjunctivitis, ulcerative keratitis, as an irrigation for operation wounds, as a dressing for removal of foreign bodies embedded in exudate on the cornea, for injecting into the viscus after liberation of the gas in tympany of the rumen and of the bowel.

Colic.—Noting the satisfactory, if not salutary effect of large doses of normal saline solution administered per stomach tube in some cases of profound nausea following deep and prolonged chloroform anæsthesia of the horse, it was decided to try a mixture of normal saline solution and formalin in colic. The result was so satisfactory that it soon became the routine treatment, and during the last sixteen months every case of so-called colic, with rare exceptions, has been treated by normal saline solution and formalin. Other agents have at times been added, and it is remarkable the quantities of different drugs and the amount of fluid that can be introduced in this way into the horse's stomach with nothing but good results. On one occasion when summoned late in the evening to a case of obstruction of the double colon that had been in severe pain for twelve hours, we administered in a single dose 1 oz. chloral hydrate, 3 drs. aloes, 5 gills linseed oil, 1 oz. formalin, ½ lb. common salt in 6 gallons of water. No further treatment was required. Similar doses have often been employed, but for general purposes 1 oz. formalin, ½ lb. salt in 4 gallons warm water meets the bill, and can hardly be improved upon. If relief does not follow in the course of two or three hours—a rare experience —a similar dose can again be given, or the ingredients added to or changed. Our usual practice is to give a similar dose of formalin, half the quantity of salt, a large quantity of water, adding linseed oil and/or chloral hydrate as we think advisable. It frequently happens that during the exhibition of the mixture per stomach tube the patient becomes a little restless; this need give no alarm, but when it does happen it is our practice to desist for a short time, but keeping the tube in the stomach until the process is again gone on with. In some instances, also, we have noted an aggravation of the symptoms—what one would rather describe as an uneasiness, shortly after the administration. This does not persist long, is not in the least alarming, and is never in any way comparable to the distressing symptoms that so frequently follow the employment of barium chloride given orally, or eserine or other similarly acting agent given hypodermically. This method of treating colic is also an aid to diagnosis. Gastric tympany is never overlooked, and when this is present, relief is immediate and permanent, and rupture avoided. In secondary tympany arising from retention and fermentation of the food in the stomach due to arrest of peristalsis, more or less relief follows the introduction of the tube into the stomach, and the lesion or obstruction causing arrest of peristalsis may consequently be more easily dealt with. When there is complete obstruction in the small intestine, the fluid introduced remains in the stomach or returns through the tube. It may thus become a further aid to diagnosis.

The advantages of this method are: It is a valuable aid to diagnosis; there is no risk of foreign body pneumonia; the exact quantity of medicine is known; there are no harmful results to the mucosa of the alimentary tract from concentrated, irritating medicaments; disinfection of the gastro-intestinal tract; the risk of rupture of stomach or bowel is reduced to a minimum, or absent; absence of nausea; early recovery and return to work; the animal often starts to feed as soon as the pain disappears; no risk of super-purgation; from close observation, the percentage of cases developing displacement of the bowel, after treatment has commenced, would appear to be greatly reduced; it may be employed without hesitation to in-foal mares.

For these reasons we believe that it is the best treatment for, and is not contra-indicated in any of the various disorders commonly termed colic. A possible exception is so-called spasmodic colic, accompanied by fluid or semi-fluid evacuations, for which chlorodyne and a moderate dose of raw linseed oil may be given instead.

Diarrhœa.—Formalin in doses of one or two drachms may be added to the ordinary remedies for this, or given alone in flour gruel. Generally speaking, we prefer to give it in half to one ounce doses in normal saline, and have found it very serviceable in some cases of diarrhœa in cattle.

For scour in sucklings, the best method is to administer the formalin and saline to the mother once daily per stomach tube, and to give in addition formalin in two drachm doses twice daily in bran mash (to the mother). Other agents such as castor oil may be given to the suckling, and followed up with grey powder or other drug that may be considered more suitable for the case. Generally, however, the saline and formalin alone treatment for the mother is successful.

Gastro-intestinal auto-intoxication of some degree is probably a not infrequent accompaniment of so-called colic, so that a vicious cycle is created, complicating the case. One pronounced case due to paresis of the bowel owing to a chronic lesion of the bowel wall, treated by formalin and normal saline is perhaps worth recording. Briefly the symptoms were: Animal—a mare—stood with all four limbs close together, the body projected forward, head carried low, or with nose resting on the manger, or pressing against the wall or other object. When compelled to move, the gait was unsteady, staggering, pulse infrequent, slow; temperature slightly subnormal; appetite in total abeyance, bowels torpid. The mouth could with difficulty be opened and that only slightly; the tongue appeared swollen and furred; odour from mouth was most offensive. Six drachms of formalin and a half pound of salt in four gallons of water were administered per stomach tube at midday. In the evening an improvement was noted, and one ounce of formalin and four ounces of salt were given in three gallons of water. Next morning there was a transformation of the clinical picture. The patient was particularly cheerful, firm on her legs, moved freely about the box of her own accord with head erect, ears pricked, and looking anxiously for food, which she greedily devoured. The disagreeable odour had left the mouth, which was easily opened, and the tongue was almost normal. The box was littered with great heaps of somewhat dry fæces.

Toxæmia from pustular eruption of the skin in Strangles.

Called urgently to a mare that had suddenly collapsed in her box. On arrival I found my patient lying stretched out flat on her off-side and grunting with every expiration; pulse about 80, and of fair volume and tone; temperature 103·8, and the eyes oscillating in a remarkable manner. An attempt to raise the head failed, and gave one the impression that the muscles of the off-side of the neck were spasmodically contracted.

History.—Mare had foaled three weeks previously while suffering from a "strangling cold," an abscess having formed and burst in the intermaxillary space. Other abscesses of varying sizes had subsequently appeared in different parts of the body. When seen by the writer, parts of the body were covered by innumerable small abscesses; and a cold abscess in the intermaxillary space noted. The case seemed hopeless. One and a half ounces of formalin and three-quarters of a pound of salt in six gallons of water was given by stomach tube. About fifteen hours later she rose without assistance. Nystagmus still present, but less marked. Twenty-four hours later oscillation of the eyes was still in evidence, but had disappeared after another twelve hours. The mare received a second dose of formalin and saline solution similar to the first the next day. Other two doses were subsequently given with an interval of some days between. During the two weeks following the first visit, the mare received formalin in two drachm doses given in mash. Three weeks after first visit she had made a perfect recovery, but was still down in condition.

An unnamed affection of cows.—This has been recognised by the writer for many years, but a description of it has never so far as he is aware appeared in print.

The usual history from calving, up to a period of twelve days, never less and generally a little more; the animal has done well, feeding, milking, and in every other way behaving satisfactorily. But about the time mentioned *the appetite fails for everything but fodder, the secretion of milk is suddenly and greatly reduced in quantity. The animal loses flesh rapidly, and presents an empty appearance* (clappéd). *The fæces are dry and passed in cakes, which have a glazed or glistening appearance.* The temperature throughout is normal and the pulse generally little altered, at least in the early stages. The bowels do not respond readily to laxatives or purgatives, and soon dry up after being opened. The lochial discharge is scanty, or entirely suppressed. Complications, such as nervous phenomena, never develop. Formalin in two drachm doses repeated three times a day in large quantity of gruel or water has seldom or never failed to effect a cure during the last twenty years. If resorted to at once, two or three doses are generally sufficient, but when treatment is delayed or in individual cases, larger doses may be necessary. The formalin is generally combined with powdered nux vomica. The diagnosis is based on the history and the definite train of symptoms—none of which is ever absent.

It can be confused with other affections which sometimes occur about the same period; for instance, what is sometimes termed gastric milk fever. The latter almost invariably occurs within the first week. The animal shows lack of appetite, irregularity of the bowels, and there is generally a sweet mawkish odour from the breath, which sometimes pervades the whole premises. It responds readily to the treatment for milk fever, but not to the formalin treatment, and there is not the complete train of symptoms always found in the unnamed affection. In what has been termed deferred milk fever, the animal often shows lack of appetite, etc., *i.e.*, symptoms similar to those of last case, but sooner or later is apt to develop the usual symptoms of milk fever, only the nervous phenomena are generally of a much more violent type—sometimes rabiform—the patient attempting to attack the attendant with horns or feet, or in other instances viciously, and persistently licking some part of her body.

It responds to inflation, but not to formalin treatment. A full dose of chloral hydrate is a good adjunct to the treatment. Other cases of indigestion due to sudden and complete change in the diet, irrational feeding, etc., are not infrequent after calving, and may, but should not be, confused with the "unnamed affection."

Joint-ill in foals.—The same treatment as advised for scour in sucklings is employed. Subacute cases characterised by lesions in the joints, causing a moderate degree of swelling and lameness, slight elevation of the temperature, etc., often respond quickly to treatment. More acute cases of the same type with marked distension of the joint capsule—high temperature, etc., sometimes defy treatment, or may only respond when the joint is tapped with a hypodermic needle; a large proportion of the fluid allowed to flow out, and a drachm of tincture of iodine injected. This can be repeated as often as is necessary, allowing an interval of a week between the injections. Of three foals so treated a year ago, there is only one showing a slight enlargement of the joint, which it is expected will ultimately disappear. In cases of the acute septicæmic type which occur within the first few hours of life run a rapid course, terminating fatally in 24 to 48 hours. The treatment is, of course, useless.

Purpura Hæmorrhagica.—For this formalin may be given intravenously in two drachm doses in ten ounces of water at blood heat. It should be repeated a week later (earlier if necessary), whether the condition of the animal seems to require it or not. It may, however, be given in the food or per stomach tube, when a larger dose is required, and repeated as necessary. In the absence of internal lesions, recovery generally occurs.

Laminitis—Lymphangitis—Azoturia.—In each of these diseases, one ounce of formalin in saline solution will be found very serviceable, and should be repeated daily for several days if indicated.

Parturient Septicæmia Mammitis.—Give as in *Laminitis*, but if case severe, four drachm doses should in addition be given twice daily in the food—a mash with treacle.

Canker of the horse's foot.—Formalin in 1-5 per cent. solution is, in certain cases, sometimes of service, but for conducting a case to perfect recovery other agents are much to be preferred. A method which we have found very satisfactory is as follows: The horn overlying the affected parts is carefully removed to avoid the drawing of blood, the parts thoroughly cleansed with hydrogen peroxide, dressed lightly with ether or spirit, and when clean and dry as possible, anointed thoroughly and carefully with following paste, preferably prepared fresh: Iodoform 4 parts, charcoal 2 parts, liquid paraffin 3 parts. It is essential that every part of the affected tissue be thoroughly dressed.

The affected parts are packed with cotton wool, in such a way that it is likely to remain in position. The whole is then covered with fine tow and the foot kept as dry as possible. Old standing chronic cases, after being thoroughly cleansed as already advised, may be dressed with advantage in some cases with a 5 per cent. solution of formalin and then anointed with a paste as above—*cupri subacet* 3 parts being substituted for charcoal 2 parts. The dressing should be repeated every second day in bad cases, but if details are carefully attended to, it will soon be found that dressing at an interval of several days is sufficient. As the case improves, an interval of a week or more between the dressings should be allowed.

Formalin in one ounce doses should be given daily in bad cases by stomach tube, or in two drachm doses three or four times a day in a mash.

Grease.—Except in old, chronic cases, where there is structural alteration of the skin, the treatment internal and external, is the same as for canker.

For wounds, chapped teats, sore backs, sore shoulders, removing particles of chaff embedded in the exudate on the cornea, one part of formalin to 750 of water is used, and repeated several times daily if necessary.

If pain is great, 1 per cent. cocaine hydrochlor. is added.

For irrigation of wounds after radical operation for poll evil, fistulous withers, one of formalin to 1,500 of water. The strength is increased according to needs.

Remarks.—Apart from diseases of the stomach and bowel *per se*, many affections, including some of those of doubtful or of unknown etiology, take their origin in the gastro-intestinal tract. From some cause, such as catarrh, ulceration, certain food stuffs, dietetic errors, etc., the defence of the mucous membrane becomes impaired or broken down, and so toxic substances, organisms, or their products enter the portal circulation, producing results which vary with the cause.

Thus we may have intoxication of the central nervous system (stomach staggers, grass staggers), or disease in any other organ of the body. The successful treatment of many conditions so caused often presents a problem of great difficulty to the clinician. Each type of case is treated on its merits, but generally speaking, removal of any offending material, destruction or inhibition of the action of organisms, neutralisation of toxins, and restoration of the weakened membrane are indicated.

In these circumstances purgatives—in both horses and cattle—are often uncertain in action, add to the irritation already existing, and sometimes are followed by disastrous results.

The need, therefore, for some agent or combination of agents that could be relied upon to empty and purify the intestinal canal without risk of causing irritation, nausea, superpurgation, or other adverse result, is very real.

Does formalin in normal saline solution, combined, if need be, with linseed oil, supply the want? Does it do more? Does it enter the circulation, neutralising toxins circulating in the blood, and even reach the centres of disease with beneficial results?

In the writer's opinion in some instances it does in some measure do all these things. But it will require to be tested and retested before its action can be definitely established and its real value appraised.

To Mr. Lang, who brought the stomach tube and some of the properties of normal saline to his notice, the writer has already acknowledged his indebtedness. He has also to thank Mr. Forbes, of Kilmarnock, for pointing out the fact that horses generally speaking, take formalin in bran mash.

THE HUMANE SLAUGHTER OF ANIMALS.

(*Continued from page* 248.)

By GEORGE E. BODY,
Meat and Food Inspector, Torquay.

THE BLOOD AND SERUM.

LETTERS and articles have recently appeared in various journals drawing attention to the effects shooting has on the bleeding and the small amount of serum expressed from a known quantity of blood.

So far as I can ascertain the Belfast investigation has been the only test carried out, so this has been taken as a scientific standard, although I doubt if the Belfast experts would consider their few cases sufficient on which to base a standard.

Of course I am not aware of the precautions taken so as to assure that each sample was normal. But to take 250 c.c. from approximately 2 gallons of blood from each animal, set it apart and compare its colour and quantity of serum expressed, and assume each to be a normal sample, seems to me neither scientific or even fair, as so many conditions, apart from the mode of slaughter, affects the colour and quality of blood, especially the amount of serum expressed. For instance, the shape of the vessel in which the blood is retained, the method of catching, whether poured from one vessel to another as is usually the case in obtaining a sample of blood from a bullock, how handled after placing in the retaining vessel, and the period at which the samples were taken, *i.e.*, whether at commencement of bleeding, towards the final flow, or at a period between the two.

It may appear strange, but tests have proved it to be true, that the amount of serum expressed from samples taken at three different periods of bleeding show variation in quantity as well as in colour, but the totals together have shown a variable quantity. Therefore the only fair and accurate method, in my opinion, is to obtain the maximum quantity from each animal and compare the weights obtained with the weight of the animal.

In the forty cases investigated by me it will be observed that the metinan antity of blood and serum from shot animals exceed that eobaqud from animals stuck, but only to a very slight extent.

TABLE I.

SHEEP AND LAMBS. STUCK.

No.	Date.	Animal.	Weight of Carcase.	Weight of Blood.	Weight of Serum.	Percentage of Blood.	Percentage of Serum.
			lbs.	lbs.	lbs.		
1	11/4/21	Sheep ...	78	6·00	·25	7·6	·32
2	11/4/21	Sheep ...	70	6.05	·62	8·6	·88
3	11/4/21	Sheep ...	90	7·12	1·00	7·9	1·10
4	12/4/21	Lamb ...	35	2·25	·25	6·4	·71
5	12/4/21	Sheep ...	79	6·22	·25	8·2	·31
6	12/4/21	Sheep ...	73	3·93	·81	5·3	1·10
7	18/4/21	Sheep ...	79	5·74	·37	7·2	·47
8	19/4/21	Sheep ...	100	6·00	·50	6·0	·50
9	19/4/21	Sheep ...	77	3·50	·25	4·5	·32
10	25/4/21	Sheep ...	88	5·43	·81	6·1	·92
11	10/5/21	Sheep ...	78	3·74	·37	4·7	·47
12	10/5/21	Sheep ...	70	4·49	·87	6·4	1·20
13	3/5/21	Lamb ...	49	3·47	·92	7·0	1·80
14	3/5/21	Lamb ...	51	3·87	1·18	7·5	2·30
15	5/5/21	Sheep ...	71	4·81	·75	6·7	1·05
16	5/5/21	Lamb ...	42	2·18	·87	5·2	2·07
17	11/5/21	Sheep ...	67	2·74	·12	4·0	·18
18	19/5/21	Sheep ...	97	3·90	·66	4·0	·68
19	19/5/21	Sheep ...	69	5·06	1·31	7·33	1·80
20	19/5/21	Sheep ...	52	3·93	1·07	7·5	2·00
	Totals	... ...	1,415	90·73	13·23		
Average of 20 Animals		...	70·7	4·53	·66	6·40	·93

TABLE II.
SHEEP AND LAMBS. SHOT.

No.	Date.	Animals.	Weight of Carcase.	Weight of Blood.	Weight of Serum.	Percentage of Blood.	Percentage of Serum.
			lbs.	lbs.	lbs.		
1	11/4/21	Sheep ...	61	4·64	·37	7·6	·60
2	11/4/21	Sheep ...	60	5·75	·31	9·5	·51
3	11/4/21	Sheep ...	90	6·37	·37	7·0	·41
4	12/4/21	Sheep ...	86	4·50	·50	5·2	·58
5	12/4/21	Lamb ...	53	2·91	·35	5·5	·66
6	18/4/21	Sheep ...	72	4·91	·60	6·8	·83
7	18/4/21	Sheep ...	64	5·50	·75	8·6	1·10
8	19/4/21	Sheep ...	63	4·07	1·00	6·4	1·58
9	25/4/21	Sheep ...	67	4·50	1·00	6·7	1·49
10	2/5/21	Sheep ...	105	5·49	·87	5·2	·82
11	2/5/21	Sheep ...	67	3·51	·44	5·2	·62
12	3/5/21	Sheep ...	63	4·36	1·36	6·9	2·10
13	5/5/21	Lamb ...	42	3·00	1·12	7·1	2·60
14	11/5/21	Sheep ...	96	4·81	·62	5·0	·64
15	11/5/21	Lamb ...	45	2·73	·49	6·0	1·08
16	23/5/21	Sheep ...	80	5·50	·50	6·8	·62
17	26/5/21	Sheep ...	51	2·85	·49	5·8	·96
18	26/5/21	Sheep ...	88	6·00	1·12	6·9	·13
19	26/5/21	Sheep ...	72	4·88	·57	5·9	·79
20	26/5/21	Sheep ...	76	5·75	·43	7·56	·56
	Totals	... ...	1,401	92·03	13·26		
	Average for	20 Animals	70	4·61	·66	6·5	·94

TABLE III.
SAMPLES TAKEN AT VARIOUS PERIODS OF BLEEDING.
STUCK ANIMALS.

No.	Date.	Animal.	Weight of Carcase.	Weight of Blood.	Weight of Serum.	Remarks.
			lbs.	lbs.	lbs.	
(1) 1st	19/5/21	Lamb ...	51	·93	·37	Serum clear.
2nd				·86	·30	Serum very clear.
3rd				1·43	·25	Serum pink.
			Total	3·22	·92	
(2) 1st	19/5/21	Lamb ...	49	*·87	·31	Serum pink.
2nd				1·99	·62	,, bloodstained
3rd				1·00	·25	Serum clear.
			Total	3·86	1·18	
(3) 1st	17/5/21	Sheep ...	97	*·78	·16	Serum clear.
2nd				·87	·25	Serum clear.
3rd				2·25	·25	,, bloodstained
			Total	3·90	·66	

* Blood poured into vessel.

TABLE IV.

SAMPLES TAKEN AT VARIOUS PERIODS OF BLEEDING.

SHOT ANIMALS.

No.	Date.	Animal.	Weight of Carcase.	Weight of Blood.	Weight of Serum.	Remarks.
			lbs.	lbs.	lbs.	
(1) 1st	19/5/21	Sheep ...	63	·93	·37	......
2nd				1·37	·37	......
3rd				2·05	·62	......
			Total	4·35	1·36	
(2) 1st	17/5/21	Lamb ...	45	*·87	·25	Serum clear.
2nd				·43	·12	,, bloodstained.
3rd				1·43	·12	Serum clear.
			Total	2·73	·49	
(3) 1st	26/5/21	Sheep ...	72	*·68	·07	Serum bl'dst'ed.
				3·63	·50	Serum clear.
			Total	4·31	·57	
(4) 1st	26/5/21	Sheep ...	76	*·56	·12	Serum stained.
				4·75	·31	Serum clear.
			Total	5·31	·43	
(5) 1st	26/5/21	Sheep ...	51	*·62	·12	Serum stained.
				·74	·12	Serum clear.
				1·81	·25	Serum clear.
			Total	3·27	·49	

* Blood poured into vessel.

These results compare favourably with those obtained by other investigators; regard must, of course, be paid to the differences between the live and dead weights.

The weight of the animals in my Tables are the weights of the dressed carcases; those reported on by Goltz are the percentages obtained from the weight of the live animals.

Goltz demonstrated by careful weighing that in the large food animals bleeding after stunning was not less complete than after cutting the throat without stunning.

IN CATTLE.

(*a*) In slaughtering according to the Jewish method, 3·24 per cent. of the live weight.

(*b*) In using the shotting mask (*i.e.*, a form of pistol discharging a ball cartridge), 3·20 per cent. of the live weight.

(*c*) In using the striking mask (*i.e.*, a mask containing an iron bolt, which is driven into the brain by means of a wooden mallet), 2·89 per cent. of the live weight.

IN CALVES.

(*a*) In slaughtering according to the Jewish method, 4·90 per cent. of the live weight.

(*b*) By the butcher's method of cutting the throat, 4.90 per cent. of the live weight.

(*c*) By a blow with the hammer, 5·67 per cent. of the live weight.

IN SHEEP.

(*a*) In slaughtering by the Jewish method, 4·15 per cent.

(*b*) By cutting the throat or severing the carotids, 4·31 per cent.

(*c*) By a blow with the hammer, 4·35 per cent.

Or expressed in other words, a beef animal of 700 kg. lost :—

(*a*) In slaughtering according to the Jewish method, 22·68 kg. of blood.

(*b*) By use of the shooting mask, 22·40 kg. of blood.

(*c*) By use of the striking mask, 20·23 kg. of blood.

A calf of 60 kg. live weight lost :—

(*a*) By the Jewish method of slaughtering, 2.95 kg. of blood.

(*b*) By the butcher's method of sticking without stunning, 2·94 kg. of blood.

(*c*) By a hammer blow, 3·04 kg. of blood.

A sheep of 50 kg. live weight lost :—

(*a*) By the Jewish method of slaughtering, 2.07 kg. of blood.

(*b*) By the butcher's method of killing without stunning, 2·15 kg. of blood.

(*c*) By a hammer blow, 2·17 kg. of blood.

P. Falk called attention to the fact that he found no difference with regard to the keeping qualities in meat preserved in cold storage whether the animals had been killed according to the Jewish method or by killing after a previous stunning.

These investigations, I consider, prove conclusively that shooting does not retard free and adequate bleeding or the retention of serum in the carcase, but really assists the process, especially if the medulla oblongata or spinal cord is not damaged, as in the medulla oblongata are found the centres of respiration, heart action, dominating vasomotor centre, and the centre of muscular contractions.

The effectual removal of the blood and serum from animals killed with the pistol also controverts the absurd theory, recently expressed, that animals killed by the Jewish method of slaughter accounts for the freedom from cancer of the Jewish race.

Needless to say, the medical profession long since rejected the possibility of man contracting cancer from the consumption of home-killed meat. In fact, a vast number of investigations have shown that cancer cannot be transmitted from animals to man, or even from one animal to another.

In a lecture given by Professor H. A. Woodroff on "Signs of Health and Disease in Food Animals," he states :—"There was another cause of disease, but one they were not troubled with much, namely, tumours. Animals had tumours of various kinds, and sometimes they had cancer. In this matter he could affirm that cancer of the ox, sheep or pig would not be transmissible to the human subject. Certainly such a carcase so affected would be seized, but anyway there would be no fear of transmission of the disease to human beings, a fact now being recognised by the best authorities. Cancer could not be transmitted from one species to another."

Ostertag states :—"Individual organs, which enclose malignant tumours, must be considered a spoiled food material. Despite the fact that sarcomata and carcinomata occur in man, such meat is not dangerous to health for the reason that, according to all experiments, the transmission of these tumours by means of the digestive apparatus is impossible. Among hundreds of experiments that have already been made, it has only been possible, in a few isolated cases, to transmit cancer from animal to animal by introperitoneal injection and to inoculate with fibro-sarcomata."

In reference to the variation in colour of the blood when drawn from the animal, I have found that quite as many animals stuck without previous stunning bleed as dark as some shot.

The reason for this is obscure, but the most feasible explanation, to my mind, is that strange surroundings, the smell of blood, the handling of the animals previous to slaughter, and the general commotion associated with a slaughter-house, affects the nervous system of some animals more than others.

In the majority of cases where the blood is darker than normal a short exposure to the atmosphere turns the blood to its usual bright colour. In fact, I have found it impossible, except in a very few isolated cases, to detect one sample from another without reference to its distinguishing number.

Certainly a few samples have shown a small quantity of liquid blood, or blood coloured fluid, between the blood clot and the serum, but these conditions arose, in my view, to excessive splashing when blood was caught in the vessel, or rough handling of the vessel immediately preceding clotting.

KEEPING QUALITIES OF THE MEAT.

As regards the keeping qualities of the meat of animals killed by me with these humane slaughtering appliances, I have found it impossible to detect the slightest difference in the appearance, setting or keeping qualities of the meat of these animals from those killed in the ordinary way. Neither have I received complaints respecting the condition of the carcase or organs (although about 130 animals have been killed this way), except for the small amount of hæmorrhage round the brain. Intending purchasers, so I have been informed, have refused the brains owing to their blood-stained condition. Even if this is the case, it is really only a question of the external appearance of the organ, as the brain substance is no more damaged than from one stuck. Where the lobes are much broken up it generally arises from bad splitting of the head with the chopper ; but even in cases of excessive hæmorrhage, the blood is easily removed from the brain or brain cavity by soaking in salt water.

It seems strange, in view of the hundreds of thousands of animals that have been killed by shooting (the Greener killer to my knowledge has been in use for over 20 years, and many butchers I have met in my official capacity as meat inspector have killed all their large animals with a shot gun, a marble or piece of lead taking the place of the ball cartridge), yet I have never heard them say that such mode of killing had any detrimental effects on the meat. Neither, during my experience as a meat inspector, can I recollect being called to examine meat that had " gone wrong " owing to the animal having been shot.

Yet certain members of the butchering trade still have the hardihood to aver that the flesh of shot animals decomposes much more rapidly than that of animals pole-axed, a contention that has been much stimulated by the Belfast investigations. Still, I think the keenest opponent to humane slaughtering must admit that the Belfast investigation on two animals pole-axed and two animals shot looks rather foolish when compared with hundreds of thousands that have been shot during the past quarter of a century, without, so far as I can ascertain, representations being made to the authorities of the loss entailed from this method of slaughter.

Where certain carcases have deteriorated other reasons than the mode of killing must be sought as the cause of early decomposition.

Clinical.

TECHNIQUE FOR THE EARLY DIAGNOSIS OF HABRONEMIASIS.

By Major J. R. Hodgkins, D.S.O., F.R.C.V.S.,
Secunderabad, India.

The appearance of an animal suffering from verminous gastritis due to *habronemar* is sufficiently characteristic when combined with a reliable history of the case, to warrant one, after some experience, in giving a diagnosis.

Nevertheless, correct and precise diagnosis can only be based on the finding of the parasites.

Fæcal searching is a tedious process, and may occupy hours without result.

By the method about to be described, the matter can be reliably settled in ten minutes. Apparatus required is a stomach tube and two buckets of water, hot enough to be introduced into the stomach without injury. To those unversed in the use of the stomach tube, the perusal of an article (" Hydro-Therapy in the Treatment of Colics," Veterinary Journal, May, 1920, p. 168), by Major Saunders, D.S.O. is recommended; also numerous articles and demonstrations before Veterinary Societies by that sturdy pioneer of the method in Great Britain, Mr. W. W. Lang, M.R.C.V.S.

Preparation of the patient.—The animal should be fed on bran mashes without hay for two days, and then fasted for a period of thirty-six hours.

Operation.—The animal should be placed in stocks or not according to temperament, and the stomach tube passed *secundum artem.*

The stomach is then filled with the hot water, that is to say, three or four gallons should be pumped into it.

An interval of several minutes having elapsed, the animal's head is lowered and by syphonage the liquid and other contents of the stomach are withdrawn.

A second (empty) bucket should be in readiness. This should have previously been covered over its mouth by blotting paper of several thicknesses. To support the paper and assist the straining, the blotting paper must be wrapped in gauze.

Now the mucous coat of the stomach is heavily coated with mucin. This is so firmly adherent that it requires considerable force to detach it. In and underneath this mucin are situated the worms. For diagnostic purposes one must remove this mucin.

It is a physiological fact that less mucin is formed during hunger than in activity (Smith, " Veterinary Physiology," 5th Ed., p. 193), and our experience has been that it is easier to detach by hot water than cold water. Hence the recommendation for the long fasting period and the use of the hot water.

The syphonage and refilling of the stomach must be continued until the mucin comes away. This usually occurs, however, near the termination of the exit of the first three or four gallons of hot water.

The myriads of worms that descend the tube with this mucin must be seen to be appreciated.

This opens up a wide vista of new methods of treatment for the worms (*H. microstoma* and *H. muscae*) situated on the mucous membrane.

But what of *H. megastoma* safely ensconced in the sub-mucous abscess ?

MUDSORE IN ELEPHANTS.

By M. C. GUPTA,
Veterinary Graduate, c/o. Macgregor & Co,, Toungoo.

Nomenclature.—The term "Mudsore" is fairly well-known in Burma among men who work in the forests during the rains. As the symptoms in both men and elephants are more or less identical, this name has been appropriately chosen for the sores of elephants which occur during the wet season.

Geographical Distribution.—So far as I can gather information in Burma, elephants of Messrs. Macgregor & Co., Ltd., are subject to this disease in the working forests of the Toungoo District. The disease first started in the North Toungoo Division forests at Zadipo Chaung in the rain season of 1916. A few mild cases also happened in the same district not far from the infected area, the history of which points to the fact that the animals might have been grazed in or near this particular stream. In 1917 there were a few cases of a very mild form at Myohla Chaung, and only one case at the West Swa. There was a fresh outbreak in 1918 at Palabyauk Chaung in the Pyinmana Forests. One herd, consisting of ten elephants, was affected. This year (1921) the attack was in its most virulent form, and affected largely the working herds at Madan (Pyinmana). It is interesting to note that there are few or no cases amongst the elephants in the South Toungoo Forests.

Etiology.—The sores are generally attributed to originate in scratches from thorns or splinters in the jungle. That abrasions of this kind are the starting point is indicated by the fact that the sores rarely occur elsewhere than on the legs below the knees, the commonest sites being the shins, ankles, dorsum of the feet, and toe-nails. Amongst human beings, as far as my experience goes, the disease is common to those men who do rough out-door work and keep their legs wet in slush and mud. The same theory is applicable to elephants.

It is a disease essentially endemic and not epidemic. The season when the elephants are more severely affected is the middle and end of the rains. In the present outbreak of 1921 it, however, occurred in the cold weather.

From several scrapings taken from the affected elephants their microscopical examination showed a small, slender, non-motile gram-positive bacillus 3·0 to 3·5 in length, showing bipolar staining, and sometimes a beaded appearance, which I found constantly present in the sores. I was not successful in inoculating the sores into men or animals by the ordinary method of vaccination. But I succeeded in producing a typical sore in a man by binding a swab from an ulcer of an elephant on to a partially-healed abrasion for 24 hours.

The only account of Oriental sore which I have for comparison between the human beings and animals is that given in the latest edition of Castellani & Chalmer's "Tropical Medicine." This account at present sight does not correspond very closely with mine.

Now the question is whether the disease is a true Oriental sore, due to *Leishmania tropica*, as described in the medical text-books? I have failed to find *Leishmania* in scrapings. It is entirely possible that the organism is a secondary invader or produces the disease to a kind of symbiotic relationship with the *Leishmania tropica*.

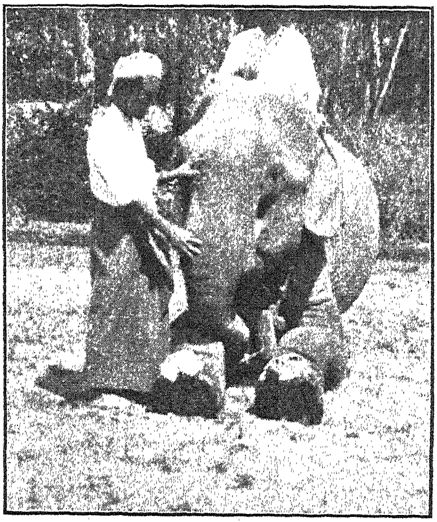

FIG. 1.—Mudsore on the Top of the Feet.

SYMPTOMS.

(1) *Mode of Commencement.*—The sore begins usually as a vesicle or papula, which quickly becomes vesicular, with an inflamed areola. The vesicle soon ruptures, and a small deep circular ulcer with a sloughing floor is formed. The ulcer grows rapidly for from three to ten days, destroying the skin and eating into the subcutaneous tissues till it attains a very big size. It is nearly always strictly circular and deeply cupped into the undermined edges. In most cases the growth of the ulcers now becomes arrested, and after a variable but usually prolonged stationary period it at last granulates up and heals in some six to eight weeks from its start. In many cases it takes much longer to heal and becomes " callous " with indurated, almost horny edges. In a certain percentage of cases the phegadenic process is more virulent and prolonged, and the sore may attain a comparatively large size, infiltrating and destroying muscles and tendons, and even extending to the bones. In two cases of the present epidemic gangrene supervened.

As mentioned above, the sores are nearly always situated on the legs below the knees. They are very often multiple. Constitutional disturbance is absent except in rare gangrenous cases. The sores are extremely painful. I have in my mind a clear picture of the unfortunate elephants standing in the stall of the temporary hospital built for them and having their sores dressed, and displaying in their features the utmost misery and pain. They could not bear to have their sores touched, and dressing them was a painful business.

(2) *Mode of Growth.*—Extension commonly takes place in two ways, viz. : (*a*) by simple growth of the primary nodule, which may be continuous and uniform or intermittent and irregular. It generally maintains a roughly circular shape, or (*b*) secondary papules may form in the areola of the primary nodule sometimes all round it, sometimes on one or other side, and often at a distance of an inch or two inches. The sores grow and proceed to coalesce, forming an extensive raised warty patch, which may be two, three or even more inches in its major axis. Its common shape is irregularly oval and seldom circular. In its natural untreated state it is found to be covered by a rough scale formed by the drying of discharge which comes from its surface.

(3) *Stage of Ulceration.*—Sooner or later in a large proportion of the sores a stage of definite ulceration sets in. It generally begins soon after the first attack. In a few cases the sores gradually dry up and shrink without breaking down into ulcers.

When ulceration does set in the centre of the sore breaks down and definite loss of substance takes place. This proceeds solely at the expense of the neoplasm, and does not extend beyond the infiltrated area of the skin. Deep tissues are also invaded. The depth of the ulcer depends on the thickness of neoplasm. In the prominent fungating sores an excavation of some depth may form. In the flat, dry sores there may appear to be nothing but a loss of surface epithelium. The edges of the ulcer are ill-defined, irregular and sometimes jagged. In some cases they are also undermined. On probing or scraping the sore it is found to consist of a thick layer of friable granulating tissue, which may have infiltrated and destroyed the whole thickness of the skin and sometimes penetrating the deep structure. This description is based on naked eye appearance only, and not on histological examinations.

The ulcer, if it does not proceed to heal, loses in time its characteristic appearances. The nodular overgrowth disappears. The margins become clear cut and often undermined, the granulating floor becomes dry and indolent, and the edges sometimes hard and horny. The sore, in fact, becomes an ordinary indolent ulcer with no destructive peculiarities to indicate its origin. The prolonged parasites have probably all died out by now.

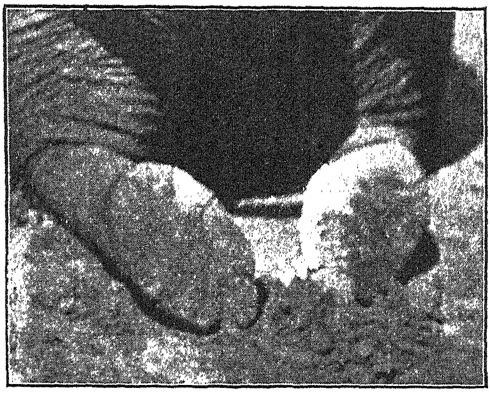

FIG. 2.—Showing the position of the Sore under the Foot.

In size the sores vary from a couple of inches to six inches—some times more—in diameter. In prominence they vary greatly. Some are most projecting growths, raised an inch above the level of the skin, and resembling at first sight fungating epithelium. Such growths are sometimes very fœtid. They are frequently multiple, and generally occur at the dorsum of the lower extremities.

(4) *Stage of Healing and Treatment.*—Healing usually sets in satisfactorily under hypochloric acid treatment. This is a valuable germicide, and by far the best and cheapest antiseptic. Wax, catechu and other indigenous drugs are generally used as a coating. The treatment,

so far, has proved very successful, and even stubborn cases have yielded with time and patience. The prognosis is generally favourable if the diagnosis is made at the early stage and treatment taken in hand at once.

REFERENCES.
(1) *Veterinary Journal.*
(2) *Indian Medical Gazette.*
(3) "Manual of Tropical Medicine" (Castellani & Chalmers).

SUSPECTED POISONING OF EIGHT CATTLE.

By W. F. ASTON, M.R.C.V.S.,
Ludlow.

THE subjects were two-year-old crossbred cattle, feeding on bean stubble which was full of weeds, though none were believed to be noxious.

On August 28 several were noticed to be failing somewhat, yet on the 30th they still appeared to be healthy and ate well. The next day four were ill and eating nothing, death of one occurred on September 2, another on the 7th, and two others were slaughtered the next day when recovery was seen to be hopeless.

The symptoms were total loss of appetite, great thirst, colicky pains, cessation of rumination, and constipation, which was followed by straining and bloody discharges of a small quantity of fœtid fæces.

As the cases progressed, great prostration supervened, followed by varying degrees of pneumonia. There was no great rise of temperature throughout the illness, and the pulse was firm, though accelerated the first few days. Respirations were hurried, and as the conditions developed, a moaning inspiration and a most marked sinking of the eyeball in the orbit. The symptoms varied, but slightly in all the cases.

The three beasts which lived made a quick recovery, and in three weeks were in as good a store condition as at the commencement of the illness. As the affection was so severe in those which succumbed, this is noteworthy as suggesting an irritant poison quickly thrown out.

Post-mortem revealed acute gastritis and enteritis; in one case there were small ulcers on tongue and larynx; an extensive black pigmentation of the rumen and bowels in two cases, and in the others to a less degree. There was atrophy and fatty degeneration of the liver and spleen, which in one case was so small it could hardly be found. Pneumonia was present in those which lived the longer.

There have been no other cases of similar illness on the farm.

As sources of poisoning, the following are suggested: The weeds, paint, etc., from building operations which might have been carried in the water, or oil from a leaky tractor. There was no bracken on the farm, though the symptoms are suggestive.

The examination of the stomach walls and contents revealed no mineral or organic poisoning, and the cause is still one for speculation.

TUBERCULOSIS IN THE CAT.

By WILLIAM L. LITTLE, M.R.C.V.S.
(*Reading.*)

THE following case was thought of sufficient interest to report. The subject was a half-bred Persian cat, nine months old, admitted to hospital for partial paralysis of the hind limbs, the animal falling over occasionally during walking. The left spermatic cord was enlarged and hardened, thought to be due to an accidental infection at the time of castration. After about one month, the left eye showed what appeared to be pus in the anterior chamber, and after a few days the lens became dislocated, and apparently absorbed, the iris being contracted ; the retina, too, appeared affected.

At this stage the patient was seen in consultation by Professor Hobday, and as palpation of the mesenteric glands revealed that these were distinctly enlarged, a diagnosis of probable tuberculosis was discussed with the owner, and the cat was destroyed.

On post-mortem examination, the left spermatic cord was found to be affected up to the inguinal ring ; the mesentery was much inflamed, and the colon showed enteritis. The mesenteric and thoracic glands were much enlarged ; the lungs showed no macroscopic lesions. The right hemisphere of the cerebrum had a caseating nodule the size of a horse bean attached to the *Dura Mater*, the brain case being affected over the nodule.

Sir J. McFadyean kindly examined the lesions and confirmed the diagnosis of tuberculosis.

The cat had been reared from a kitten by the owner, and had always been given a plentiful supply of cow's milk. I could not obtain any evidence of contact with any person or animal affected with tuberculosis.

Abstract.

ABSTRACT FROM A REPORT UPON TWENTY-FIVE CASES OF HUMAN ACTINOMYCOSIS, WITH ESPECIAL REFERENCE TO VACCINE THERAPY.*

By LEONARD COLEBROOK, M.B., B.S.Lond.,
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A DISCUSSION OF SOME PROBLEMS CONNECTED WITH THE DISEASE.

IN a previous communication† I have described the mycelial and other micro-organisms met with in investigating a series of cases of human actinomycosis, most of which were under treatment at the

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* The complete Report appears in *The Lancet*, 1921, i., 893.

† *British Jour. Exper. Pathology*, 1920, i., 197.

Inoculation Department, St. Mary's Hospital, during the years 1911-15.

In the present communication it is proposed to record what was learned from this series of cases in respect of the diagnosis, the clinical course, and particularly the treatment of the disease ; and subsequently to discuss two questions which arise—viz., What is the source of these infections ? and what restrictions is it advisable to put upon the use of the term actinomycosis ?

Definition.—The cases here dealt with all presented granulomatous lesions from which the so-called "sulphur granules," visible to the naked eye, were forthcoming, and these granules were in every case composed of a feltwork of Gram-staining mycelium. The importance of strictly limiting the use of the terms actinomycosis (and paractinomycosis) to cases of this kind will be discussed later.

Diagnosis.—We have at present no reliable method of detecting an actinomycotic infection in its early stages, *i.e.*, prior to the occurrence of suppuration. The slowly progressive, comparatively painless, and indurated lesion may suggest the diagnosis, but one is at a loss to confirm it by blood examinations, for opsonic estimations will often fail to distinguish between a tuberculous and an actinomycotic infection (the opsonic power to the tubercle bacillus is frequently high in actinomycosis), and agglutination tests with actinomyces, although they will usually give positive results in advanced cases, are apt to be negative in the milder cases. Further observations on this latter point are required.

THE INCIDENCE OF THE DISEASE AND ITS ULTIMATE ISSUE.

There is reason to think that actinomycosis occurs more frequently in this country than is generally supposed. In the cases which end fatally a correct bacteriological diagnosis is often made only when the disease is far advanced, or post-mortem, and it therefore appears probable that a large number of the less severe cases escape recognition

TABLE I.

Site of infection.	No. of cases.	Males.	Females.	Ultimate result.
Face or neck ...	10	7	3	9 recovered completely ; 1 died.*
Thorax	8	5	3	7 died ; 1 lost sight of.
Abdomen	6	1	5	5 died ; 1 recovered.
Dorsum of hand ...	1	1	—	Recovered completely.
Total	25	14	11	—

* Death was due to cerebral abscess, resulting from direct extension of the disease through the skull.

altogether—notably those cases in which the infection is situated about the lower jaw, and possibly also, as Mr. Slesinger* has suggested, some of those in which the vermiform appendix is affected. In Table I the patients observed by the author are divided up according to the site of their infection; the incidence in the two sexes is also shown, and the ultimate issue of the disease.

Table I confirms the usual experience that (*a*) cervicofacial infections are the most numerous and also the most likely to recover; (*b*) infections of the thorax and abdomen are usually fatal. The latter conclusion should, perhaps, be stated with some reserve, for the future may show that actinomycotic infections of the vermiform appendix occur much more commonly than has been supposed, and that many such cases are promptly cured by the ordinary operation of appendicectomy. (Slesinger.)

Age of the Cases.—Seventeen of the 28 cases were young adults, seven were older subjects (one of them being 70 years of age), and four were children between the ages of 10 and 13, I have not known the disease to occur below the age of 9.

Duration of the Disease.—The course of these infections was commonly a very slow one. The disease had usually been in progress for several months before the patients came to the hospital for treatment, and although in three of four instances cure was obtained within a few weeks, the larger number of those who recovered were under treatment for a period of months. One case in whom the infection extended widely in the ramus of the mandible was apparently cured after three to four years, but a small focus reappeared in front of the ear and has persisted for a further two years. The fatal cases of thoracic or abdominal infection usually survived from one to two years from the onset of the disease. One abdominal case was terminated abruptly after several weeks in hospital by the development of septic peritonitis.

TREATMENT.

Most of the cases had been treated by potassium iodide and by incisions before coming to the Inoculation Department at St. Mary's Hospital. The iodide had not usually been pushed beyond 30—40 grs. per diem; in one or two instances 60—90 grs. had been given. In these doses the drug had not exercised any appreciable effect upon the disease. Its use was usually discontinued soon after the patients came under observation; in a few instances, however, on the suggestion of the surgeon who was collaborating in the treatment of a patient, the drug was continued and pushed up to 180 grs. or more per diem, but still without effecting any improvement in the patient's condition.

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* *Lancet*, 1920, i., 1,220.

It should be acknowledged that the patients so treated were very unfavourable cases.

Upon inquiring into the origin and the general experience of this method of treatment I have failed to find that it has an assured scientific basis, or even a sufficient vindication by results. Introduced empirically by Thomassen* in 1885 for actinomycosis of the tongue in cattle, it was later acclaimed by Nocard† (1893) as an almost infallible remedy for this condition. When it came to be applied to the treatment of other actinomycotic lesions in cattle the results seem to have been less uniformly good, but I understand that it is still regarded by the veterinarians as a specific remedy.

Investigations undertaken with a view to finding an explanation of its reputed specific action have so far been quite unsuccessful.

Speaking generally, the treatment of the patients while under the author's care was (*a*) by surgical measures, and (*b*) by the inoculation of vaccines. The surgical measures taken were usually confined to incisions for the evacuation of pus and curetting. In connection with each of these procedures something was learned from our experience. We learned, in the first place, that a single incision will seldom suffice to maintain satisfactory drainage of an actinomycotic focus. It is characteristic of this infection in man that it spreads by direct extension in contiguous tissues—particularly in the connective tissues—and leads to the formation of small abscess cavities here and there along the line of spread. To check the invasion one must be constantly on the watch for fresh areas of induration and softening, and must resort early to incision of these as often as they appear. My experience leads me to conclude that this policy of early and, if necessary, repeated incisions, is of paramount importance in the treatment of the disease. I think one may go so far as to say that in every focus that is satisfactorily drained the infection by actinomyces will be promptly checked, for this organism, although it can propagate in the fluid of an abscess cavity (which has lost much of its antitryptic power) cannot do so in the unaltered lymph.

This being the case, I would suggest that the principles of treatment advocated by Sir Almroth Wright ‡ in connection with wound infections should be employed here, the incisions being followed up by the intermittent application (every two to three hours) of hypertonic salt solution (3 to 5 per cent.) in order to promote a free flow of lymph through, and out of, the infected tissues. This treatment should be discontinued after a few days in order to facilitate healing.

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* *L'Echo Vétérinaire*, 1885.

† *Revue de Méd. Vétérinaire*, 1893.

‡ *Brit. Med. Journal*, 1916, i., 793.

What we learned in connection with curetting was that this operation should not be performed with a sharp instrument—which opens up uninfected tissues—but with a dry gauze swab. There is in actinomycosis a fairly sharp line of demarcation between the uninfected and the infected tissues, and since the latter, in process of erosion, are very friable, it is usually possible to remove them almost *in toto* on a swab, leaving the wound with so little infection that it can easily be dealt with by the leucocytes. In one of the later cases of the series here reported an abscess nearly as large as a closed fist was treated in this way after incision and forthwith sewn up. It healed by first intention in a week.

TREATMENT BY VACCINES.

Up to the present the writer has treated some twenty-three cases by this method, always in association with simple surgical measures, as outlined above. In all cases a vaccine prepared from strains of *Actinomyces bovis* of human origin was employed, and most of them received in addition other vaccines corresponding to their respective secondary infections. Autogenous actinomyces vaccines were used for eleven cases, most of the remainder being treated by the polyvalent stock vaccine prepared at St. Mary's Hospital and issued by Messrs. Parke, Davis & Co.

THE RESULTS OF VACCINE TREATMENT.

The inoculated cases comprise :—Eleven cervico-facial infections, with which may be included one of the hand ; six thoracic infections ; six abdominal infections. The first group—of eleven cases—included two which were decidedly unfavourable to any treatment. Nine of them have not, so far as I have been able to ascertain, had any recurrence during the four to six years that have elapsed. In the least extensive cases a period of three to six weeks sufficed for cure, but in others a much longer time was required and many inoculations. Whenever bone was involved the recovery was very slow.

Of the six thoracic cases none have been saved. In considering this melancholy failure it should be made clear that in all of them the disease had made considerable headway before vaccine treatment was instituted.

With regard to the six abdominal cases much the same considerations apply. The five of them who died had been ill for 13, 8, 6, 5, and 5 months respectively before they were transferred to us for treatment.

CONCLUSIONS WITH REGARD TO VACCINE TREATMENT.

The opinion I have formed from my experience up to date is as follows :—The treatment of actinomycosis by vaccines facilitates recovery when efficient surgical drainage of the affected tissues is secured and maintained; when, however, drainage is unsatisfactory the use of appropriate vaccines will not usually suffice to stay the progress of the infection. In three or four of my cases which had hung fire for several weeks or months, improvement took place so promptly and so rapidly after the commencement of inoculations that there seemed to be no doubt as to the efficacy of the treatment, and this opinion found further support from the case of thoracic infection whose story has been told above.

With reference to the failure of vaccine treatment in cases whose lesions are not satisfactorily drained I would suggest that this may be due in a large part to the blood stream having very little access to those lesions by reason of the zone of "wooden" induration which habitually surrounds them.

DISCUSSION.

(1) CONCERNING THE TERM ACTINOMYCOSIS.

There is, unfortunately, a great deal of confusion with regard to the use of this term. In what follows I shall try to show that under it have been included in the past at least four classes of cases. As a consequence our knowledge of these infections has become less, rather than more exact, and progress in the direction of better treatment has been undoubtedly handicapped. The recent application of vaccine therapy to these cases makes it particularly desirable that we should deal, as far as possible, with homogeneous groups of cases, and give to these groups distinguishing names. We may now consider what restrictions it might be well to put upon the term actinomycosis.

The origin of this term dates back to the discovery of the well-known radiating arrangement of "clubs" round the "sulphur granules" derived from certain granulomatous lesions of cattle and of man. So far as was known at that time such granules were always composed of a feltwork of branching mycelium. It is readily understood, then, that the presence of "granules" came to be regarded as diagnostic and pathognomonic of actinomycosis. When, with the introduction of artificial media, cultures were obtained from some of these infections, several quite distinct organisms were reported by different investigators, the types which attracted most attention being (1) an easily grown, arobic variety, described by Boström and others; and (2) an anaerobic variety, grown with difficulty, described by Wolff and Israel. In view of these discordant results of the earlier bacteriological work it came to be believed that there was no one infective agent responsible for actinomycosis, but that several more or less allied micro-organisms could produce the disease.

The work of the past 20 years, however, has brought to light two facts which require us to recast the earlier views. It has shown

(1) that the production of granules with clubs is not pathognomonic of actinomycosis ; the same thing occurs in various conditions which are not mycoses at all but bacillary infections, and sometimes is associated with clinical conditions totally different from those of actinomycosis. (2) That of all the human infections which are productive of " granules " and show the well-known clinical features of actinomycosis, the great majority are due to one and the same mycelial species, viz., that described by Wolff and Israel.

Lignières and Spitz* have described an infection of cattle which gives rise to granulomatous tissue not unlike those of actinomycosis, but in which the " sulphur granules " (showing typical clubs) are composed entirely of Gram-negative bacilli. They gave the name " actinobacillose " to this condition and that of " *actinobacille* " to the microbe. These authors state that this infection is widely spread in the world. Nocard† reported cases in France in 1902, and in 1915 Griffith,‡ examining so-called actinomycotic material (chiefly tongues) derived from cattle killed in England, made the important discovery that no less than forty out of forty-four specimens presented lesions which were apparently due to this bacillus and not to a mycotic infection.

Apart from actinobacillosis it is well known that the injection of tubercle bacilli will, in certain circumstances, give rise to club formation around the masses of bacilli. Further, Lignières and Spitz§ state that granules with clubs (" massues rayonnées ") may occur in animal infections produced by various other microbes, *e.g.*, by the butter bacillus of Rabinowitsch, the bacillus of Cozzolino,

We may pass now to the statement that the great majority of actinomycotic infections are due to one microbic species, viz., the anaerobic type *Actinomyces bovis*|| described by Wolff and Israel.** The data relating to that conclusion may conveniently be set out in the form of a table (Table III) showing the more important of the records of bacteriological investigations made during the past 20 years.

It will be seen from Table III that in seven different parts of the world one and the same type of mycelial organism, viz., that described by Wolff and Israel (1891), has played a predominant part in the actinomycotic infections both of man and cattle.

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* *Receuil de Med. Vet.*, 1902, 487.

† *Receuil de Med. Vet.*, 1902, 450 and 695.

‡ *Journal Hygiene*, 1916, xv., 195.

§ *Receuil de Med. Vet.*, 1902, 487.

|| *Archiv. f. pathol. Anat. u. Physiol* (Virehar), 1891, cxxxvi., 11.

** In adopting the name *Actinomyces bovis* for this type I follow the usage which seems to have the most general support. Some writers, including Lignières and Spitz, have held that the name properly belongs to the quite different aerobic organism described by Boström and others.

TABLE III.

(A) Number of cases from which cultures were obtained and the type of mycelial organism determined.

(B) Number of cases from which *Actinomyces bovis* (Wolff-Israel) was cultivated. It is not claimed that the description given by each investigator for the strains included in this column tallies exactly with that of Wolff and Israel. There is, unfortunately, at present no touchstone by which to decide unequivocally whether a given strain is or is not identical with the type Wolff-Israel. The figures given should, therefore, be taken to mean that each investigator himself regarded so many of his strains as showing a general correspondence with that type.

(C) Number of cases from which an anaerobic mycelial organism quite distinct from *Actinomyces bovis* was cultivated.

(D) Number of cases from which an aerobic mycelial organism was cultivated.

Name of investigator, date of publication, and country in which the cases occurred.	Infections of man.				Infections of cattle.			
	(A)	(B)	(C)	(D)	(A)	(B)	(C)	(D)
Levy (1899), Germany	5	5	0	0	—	—	—	—
Schukevitsch (1903), Russia ...	—	—	—	—	25	22	—	3
Homer Wright (1905), U.S.A. ...	13	13	0	0	2	2	0	0
Shiota (1909), Japan	29	28 (*a*)	—	—	—	—	—	—
Harbitz and Grondahl (1911), Norway	20	20	0	0	—	—	—	—
Pinoy (1913), France	3	2 (*b*)	—	—	16	14	—	2
Colebrook (1920), England	24	21	2 (*c*)	1 (*d*)	—	—	—	—
Totals	94	89	2	1	43	38	0	5

(*a*) The character of the one remaining strain not described.

(*b*) One strain not identified.

(*c*) It is doubtful whether these two strains were really distinct from *Actinomyces bovis* or merely variants of that type. They showed slight differences in respect of their cultural characters, but owing to pressure of other work were not fully investigated.

(*d*) A single colony of the mycelial organism was cultivated from this case.

(2) WHAT IS THE SOURCE OF INFECTION IN ACTINOMYCOSIS?

The answer to this question is given—either definitely stated or implied—in every surgical and veterinary text-book. But is it true? The "ray fungus," we are told, has its habitat in soil, on grain, straws, and other vegetable matter and is conveyed by these to the tissues of man and animals. This belief is chiefly due to the advocacy of Boström, who, in 1891, published a report of a laborious investigation on the subject. He observed that cattle grazing in marshy districts frequently developed actinomycosis, and that moulds were met with on the vegetation of such districts, which showed some resemblance to certain mycelial organisms which had occasionally been cultivated from actinomycotic discharges. Further, on examining the mouths of cattle Boström noticed that particles of vegetable matter were very frequently forced down between the teeth and gums, and he concluded that these particles probably carried the infection into the tissues. By means of serial sections he succeeded in demonstrating minute fragments of vegetable matter (barley "whiskers") in several instances, and he reports in detail the case of a woman who developed a submaxillary abscess, in the pus of which a similar tiny particle of barley (1×0.2 mm.) was detected.

This chain of evidence is not, however, very satisfactory when looked at from the standpoint of to-day. We now know, as has been shown above, that an anaerobic species (*Actinomyces bovis*), and not the organism described by Boström, is most commonly the infecting agent in actinomycosis, of man at any rate. Secondly, *Actinomyces bovis* has never, so far as I am able to ascertain, been met with outside the animal body. There are many species of actinomycetes recoverable from soil, but all appear to be aerobic organisms with characters quite different from those of *Actinomyces bovis*. Harbitz reports an attempt of Hagen to recover the latter organism from "natural" sources in a part of Norway where actinomycosis was fairly common. He investigated nine strains of mycelial organisms (three obtained from the air, two from straw, three from barley and oats, and one from manure), but all were compulsory aerobes. Thirdly, *Actinomyces bovis* is a very delicate organism, which grows only at temperatures near that of the human body and very sparsely, if at all, in the presence of air; it also dies out very readily, especially when dried, and has not been shown to form spores. Having these characters, there is little likelihood that it has its "natural" habitat outside the human and animal body. Again, it is, perhaps, significant that the incidence of actinomycosis seems to be no greater among the agricultural population than among town-dwellers; and women are affected almost as frequently as men. Finally, it may be remarked that only in a very small percentage of cases is there any record of a vegetable foreign body having been evacuated from the primary abscess or a history which suggests the probability of this mode of infection. Only one of the author's twenty-five cases had such a history.

In view of all the above considerations it seems highly improbable that infection is usually conveyed to man in the manner suggested by Boström. At the same time one must acknowledge that there are a fair number of well-attested cases on record in which infection seems definitely to have followed the impaction of vegetable material.

Translation.

INTOXICATION BY YOUNG SHOOTS OF RHODODENDRON.

By M. ROSSIGNOL,
Pupil at the Alfort School.

On the evening of February 10 M.C., under-gardener in one of the large Parisian gardens, gave, as green food in the ration for his three goats, a handful (about 800 grammes) of young shoots of Rhododendron Ponticum, which had been cut the same day. Next morning he found his animals stiff in their limbs, dejected, holding the head low, bleating plaintively, grinding the teeth, and a greenish saliva escaping in long threads from the labial commissures, whilst the litter and sides of the box, up to the height of the animals, was soiled with vomit that had been forcibly expelled.

In the litter M.C. found a good half-handful of shoots, and a number of rhododendron leaves, which had been expelled intact. The three subjects showed loss of appetite, constipation shown by fruitless expulsive efforts, and received 100 grammes each of warm castor oil. In the course of the day the animals received besides some tea, linseed mucilage, and bicarbonate of soda.

Towards the evening one of patients (five years old), which had never lain down, fell as if paralysed, vomited for the last time, and died.

A second subject (seven years old) kept lying down and getting up with difficulty all day on February 12, showed general tremors and true tetanic spasms, and died on the morning of the 13th.

The third subject (three years old), whose symptoms of poisoning were less accentuated, received warm milk with bicarbonate of soda, and eight to ten times daily abundant (two to four quarts) injections of warm water. On the 14th the animal vomited once, constipation declined, stiffness disappeared gradually, and on the 18th he was put on normal diet.

Most of these symptoms coincide with Cornevin's description of rhododendron poisoning, but constipation was one of the symptoms that struck the owner most, whilst Cornevin gives intense diarrhœa. Further toxic symptoms do not seem to be eliminated as quickly as Cornevin indicates, since the subject surviving was not out of danger until the end of the fourth day. Finally, from observation after the accident, a relatively small dose of the leaves (200 grammes per animal as a maximum) can lead to a fatal issue.

Personal.

OUR colleague, Dr. H. B. Elliott, M.R.C.V.S., appears to have "made good" in Hawaii, as at a meeting of the principal citizens of Hilo this gentleman was elected chairman of the First Civic Convention, of which he was practically the founder. Through his energies an inter-island Council has been formed to deal with questions of citizenship, the language to be taught in the schools, matters affecting commerce, and other things of vital importance affecting the prosperity of these "go-ahead" little islands which form so prosperous a portion of the United States of America.

After graduating from the New Veterinary College in 1894, Mr. Elliott practised for some time at Ayr, relinquishing this to go to America, where he eventually settled down as Territorial Veterinarian at Hilo, Hawaii. His genial manner and professional skill speedily brought him a first-class *clientèle*, and he has held many civic positions which have justified the confidence of his fellow citizens.

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SEPTEMBER, 1921.

Editorials.

THE TUBERCULOSIS-FREE ACCREDITED HERD SYSTEM.

THE method of an official list of tuberculosis-free accredited herds as a semi-voluntary effort on the part of owners, boosted up by Government support, has made excellent progress in the United States, where the Bureau of Animal Industry gave the scheme its blessing in 1917; and it is to the veterinary staff that the credit of the idea is due. It is a plan for assisting the owner of a pure bred herd to get rid of tuberculosis, if it is present; and when he has done so to give him the advantage of having his herd placed on an official list of tuberculosis-free or "accredited" herds. In the United States the list has already several hundreds of such, and the idea has "caught on."

Canada is now falling into line, and in his annual reports for 1920 and 1921 (which have just come to hand) the Veterinary Director-General (Dr. Frederick Torrance, B.A., D.V.Sc.) urges the necessity for the adoption of the scheme if Canada does not wish to lose its place in the sale of pure bred stock to the American market.

It is interesting to read the regulations drawn up for the furtherance of this scheme, and it is time, with an estimate of at least a million tuberculosis dairy cattle in Great Britain, that the Government of this country awakened to a sense of its responsibility in this direction. If any lethal agent other than tuberculosis milk was sold for human consumption the outcry of popular opinion would be so great that legal action would have to be taken; and when it is proved by medical statistics that thousands of infants die annually of tuberculosis of bovine origin one can scarcely understand why the subject excites so little attention. It is for us, as a profession, to hammer away on every possible occasion to get the Tuberculosis of Animals Order, which had commenced to do good work, but which was temporarily suspended in 1914, put on the Statute Book again, and by doing so we can help very materially to stamp out this terrible disease from man and animals.

Writing of tuberculosis milk in Canada, Dr. Torrance says :—" In municipal testing the work is slowly extending, but not to the extent that might be expected. Municipalities do not appear to realise the advantage of the Government's offer to test dairy herds free of charge and to pay compensation for cattle slaughtered as diseased. Many cities appear to think that pasteurising the milk affords every protection. Other cities do not even take this precaution and the citizens are left to take their chances. The burden of this carelessness does not fall upon those who deserve it, but upon the poor defenceless children, many of whom are doomed to early graves or to lives of crippled misery from tubercular infection carried by the milk of diseased cows. Our first test of certain dairies sometimes reveals appalling conditions. In one dairy our inspectors found ten cows all of which reacted to the tuberculin test. When these were slaughtered, all were found diseased, some extensively. Among them were cows whose milk was loaded with tubercle bacilli. This dairy was distributing raw milk daily in the city. How many children were exposed to disease in this way is unknown, or how many contracted the disease, but there is no reason to expect that all escaped. The city in question now has a safe milk supply, as all raw milk offered for sale is derived from tuberculin tested cows."

The following are the Canadian Government Regulations of the Establishment and Maintenance of Tuberculosis-free Accredited Herds of Cattle :—

1. A tuberculosis-free accredited pure-bred herd is one which has been tuberculin tested by the subcutaneous method, or any other test approved by the Veterinary Director-General, and applied by the regularly employed veterinary inspectors of the Health of Animals Branch of the Federal Department of Agriculture. Further, it shall be a herd in which no animal affected with tuberculosis has been found

upon two annual or three semi-annual tuberculin tests, as above described, and by physical examination.

2. The entire herd, or any cattle in the herd, shall be tuberculin tested or retested at such time as is considered necessary by the Veterinary Director-General.

3. No cattle shall be presented to the tuberculin test which have been injected with tuberculin within 60 days immediately preceding or which have at any time reacted to a tuberculin test.

4. No herd shall be classed as an accredited herd in which tuberculosis has been found by the application of the test, as referred to in paragraph 1, until such herd has been successfully subjected to two consecutive tests with tuberculin, applied at intervals of not less than six months, the first interval dating from the time of removal of the tuberculous animals from the herd.

5. Prior to each tuberculin test satisfactory evidence of the identity of the registered animal shall be presented to the inspector. Any grade cattle maintained in the herd, or associated with animals of the herd, shall be identified by a tag or other markings satisfactory to the Veterinary Director-General.

6. All removals of registered cattle from the herd, either by sale, death or slaughter, shall be reported promptly to the said Veterinary Director-General, giving the identification of the animals, and, if so, the name and address of the person to whom transferred. If the transfer is made from the accredited herd to another accredited herd, the shipment shall be made only in properly cleaned and disinfected cars. No cattle shall be allowed to associate with the herd which have not passed a tuberculin test approved by the Veterinary Director-General.

7. All milk and other dairy products fed to calves shall be that produced by an accredited herd, or, if from outside or unknown sources, it shall be pasteurised by heating to not less than 150° F. for not less than 20 minutes.

8. All reasonable sanitary measures and other recommendations by the Federal authorities for the control of tuberculosis shall be complied with.

9. Cattle from an accredited herd may be shipped to the United States accompanied by the certificate of the Veterinary Director-General, without further tuberculin test for a period of one year, subject to the rules and regulations of the State of destination.

10. Strict compliance with these methods and rules shall entitle the owner of tuberculosis-free herds to a certificate, " Tuberculosis-

free Accredited Herd," to be issued by the Veterinary Director-General. Said certificate shall be good for one year from date of test unless revoked at an earlier date.

11. Failure on the part of owners to comply with the letter or spirit of these methods and rules shall be considered sufficient cause for immediate cancellation of co-operation with them by the Federal officials.

12. Whenever in carrying out this order it is necessary to slaughter an animal or animals for the eradication of tuberculosis from a herd, the animal or animals shall be valued and compensation awarded as provided in Sections 6 and 7 of the Animal Contagious Diseases Act.

IMPROVEMENTS IN TESTING.

Until recently, a subcutaneous or thermal tuberculin test has been the only one receiving general recognition, further experience with other tests, notably the intradermal, is strengthening the claims of its advocates as being of equal value. In some parts of the United States this test has been official for some time and it has certain inherent advantages which render it attractive to those in control work. It relieves the inspector of the drudgery of prolonged observation of temperature, it economises the time of inspectors, and it is not readily interfered with by accidental or intentional influences. It can also be applied frequently to the same animal without producing immunity to tuberculin.

Tuberculin testing has been going on in many herds for several years, and with the repeated injection of tuberculin in the same animals, there is grave danger of producing a condition where tuberculin will give no reaction in a diseased animal when used in the subcutaneous test. The intradermal method will cause a reaction in most of such animals, and is therefore of great value in testing herds where tuberculin has frequently been injected.

A third test, the ophthalmic, is also receiving much attention, and although not yet given the confidence of either of the other tests, is undoubtedly of value.

Combinations of two or three of these tests are now frequently used with advantage, revealing cases of tuberculosis which a single test would have failed to pick out. The branch is making use of all these methods of testing from time to time with a view to attaining the highest possible efficiency in the detection of latent or obscure cases of tuberculosis, which, if left in a herd, in process of cleaning up for accreditation, would sooner or later become "spreaders" and disseminate the disease.

REPORT ON AN ENQUIRY INTO A UNIFORM SYSTEM AND STANDARD OF MEAT INSPECTION IN SCOTLAND.*

LOCAL authorities and other representative bodies in Scotland repeatedly urged the Scottish Board of Health to establish a uniform system of meat inspection in Scotland, and in 1914 the Board issued instructions to Dr. Leighton to enquire into and report on the question. The enquiry was interrupted by the war and could not be resumed until last year.

In the first part of the report now issued, an account of the conditions presently existing throughout Scotland in respect of meat inspection is set forth. It is stated that the number of qualified inspectors in the country is quite inadequate, and many of the inspectors employed have no technical knowledge of the subject. In the counties there is no regular or reliable meat inspection. In 94 burghs out of a total of 203 the whole of the meat slaughtered is inspected, and in 86 inspection is dependent on part-time inspectors, who are only called in when required, or who visit the slaughterhouse in the intervals between other duties. In the public abattoirs there are, broadly speaking, two systems of inspection. The first is that of large centres like Edinburgh, Glasgow, Leith, etc., where the local authorities have appointed qualified veterinary surgeons for the inspection of meat, and where every carcase is inspected as it is killed or before it leaves the premises. The second is that prevalent in a larger number of public abattoirs located in places smaller than those mentioned, in which the inspector is not constantly on duty, and the usual arrangement is for the superintendent to call in the medical officer of health or veterinary inspector to pass judgment on any suspicious carcase which is observed. Meat inspection throughout the country is characterised by an extraordinary lack of system, which is not peculiar to Scotland. With the exception of two or three of the largest abattoirs, where there is a full technical staff, there is practically no system recognised as the proper procedure. This leads to careless inspection, but in many cases the absence of method and system is due to the fact that there are too few inspectors to do the work properly. The returns made by the local authorities show that in 39 burghs and in 136 slaughterhouses distributed over 24 counties, no meat had ever been condemned. These burghs are all small places, many of them mere villages. There are wide variations in the standard of inspection.

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*Report on an Enquiry into a Uniform System and Standard of Meat Inspection in Scotland by Lieut.-Colonel Gerald Leighton, O.B.E., M.D., F.R.S.E., Medical Officer (Foods) Scottish Board of Health.

A high standard is maintained where whole-time qualified inspectors are employed.

Verbatim reports are given of the conclusions reached by three committees of experts appointed by the Board at the request of Dr. Leighton to assist him in the later stages of the enquiry. These committees considered : (1) Questions of administration ; (2) inspection in rural districts ; and (3) the standards of meat inspection, respectively. The following veterinary representatives were included in the personnel :—Professors Gaiger and Matheson, Messrs. Trotter, Gofton, D. Hamilton, Wm. Brown and Medlock, together with Medical Officers of Health, Sanitary Inspectors and representatives from the Board of Agriculture for Scotland, Scottish Chamber of Agriculture, Convention of Royal Burghs, Scottish Federation of Meat Traders, Association of County Councils, and the Incorporated Sanitary Association of Scotland.

The report of the Committee on Administration may be summarised as follows :—

In respect of officials with power to condemn meat, Section 43 of the Public Health (Scotland) Act, 1897, confers co-equal powers on the Medical Officer of Health, Sanitary Inspector and Veterinary Surgeon approved for the purpose of the Section, but the training and duties of sanitary inspectors are for the most part such that they have rarely the opportunity of becoming qualified to perform efficiently the important work of meat inspection. The Committee, therefore, is of opinion that the work of meat inspection should not be entrusted to a sanitary inspector except with the sanction of the Scottish Board of Health, which should only be given (1) when the sanitary inspector concerned possesses special qualifications and (2) when the services of a qualified veterinary surgeon or a medical officer specially trained in meat inspection are not available. They consider that the most appropriate official to be designated for this work of inspection is the veterinary surgeon, but as the work is carried out for the protection of the health of the public, and as the medical officer of health is the responsible official in this connection, the veterinary surgeon should work in close co-operation with him. They therefore recommend "that the actual seizure of meat with a view to condemnation as unfit for the food of man should be in the hands of fully qualified inspectors only, viz., the medical officer of health, or a veterinary surgeon, or a sanitary inspector appointed for the purpose."

In the case of public abattoirs, all detained meat should be examined by a veterinary surgeon or other qualified person appointed and paid by the local authority for that purpose.

In order to secure uniformity of inspection and of general administration, private slaughterhouses should, as far as possible, be abolished. It might not be practicable to accomplish this entirely in remote landward districts, but in the exceptional cases where private slaughterhouses are permitted the hours of work therein should be strictly limited by the terms of the licence, and arrangements should be made by the local authority for the inspection of all meat by qualified inspectors. All persons employed in the actual killing of animals should be licensed annually by the local authority on conditions laid down by the Scottish Board of Health.

The Committee sees no objection to a system of marking meat which has been inspected, but they do not consider this course absolutely necessary except in a few special cases. It is, however, recommended that no carcase should be sent from the area of one local authority to that of another without being marked to indicate that it had been inspected.

All cases in which animals are slaughtered for emergency reasons or dressed for the food of man in premises other than licensed slaughterhouses should be immediately notified to the local authority of the area within which the slaughtering takes place, and the carcase—with the lungs, heart, liver and spleen attached—should be detained until inspected by a qualified inspector. All persons receiving carcases slaughtered elsewhere than in a licensed slaughterhouse in Scotland should immediately notify the local authority of the area in which the carcase is received.

In the Counties of Aberdeen, Ayr, Dumfries, Kirkcudbright and Wigtown at least 30,000 pigs are slaughtered annually on farms and are despatched to bacon curers, etc., without inspection. The provision of adequate inspection for these pigs presents a difficult problem for meat inspectors. To meet this difficulty the Committee makes the following recommendations :—" That pigs should not be slaughtered on private premises except in a part of the premises licensed for the purpose by the local authority; that such licensed premises and their management should conform to bye-laws framed by the local authority and confirmed by the Scottish Board of Health; that notification of intention to slaughter should be sent by the farmer or person intending to slaughter to the local authority five days before the date of slaughter, and that the local authority should send an approved inspector to examine the carcase—to which the lungs, heart, liver and spleen must be left attached—before the carcase is passed for human consumption."

(Exception is taken to the recommendations as to the slaughtering of pigs on farms by one member of the Committee on the grounds that they appear to be contrary to a previous recommendation that all private slaughterhouses should be abolished ; they give an appearance of permanency to an arrangement which ought to be regarded merely as a temporary expedient until central slaughterhouses can be established ; inspection would be cumbersome, expensive and inadequate.)

It is recommended that the Scottish Board of Health should appoint a staff of veterinary inspectors, whose duty it would be to visit systematically the abattoirs in a definite area and report to the Board's Chief Inspector of Foods.

The Committee on Rural Districts and the Committee on Standards each made recommendations, which should be read by everyone interested in the details of meat inspection.

Recommendations were made as to the action to be taken when evidence of tuberculosis is found in bovines and swine, and these should be carefully perused by every student of pathology, whether a graduate or still attending college. For these alone the " Enquiry " is worth purchase.

(In these recommendations a very considerable departure has been made from the recommendations of the Royal Commission on Tuberculosis, which have in many cases continued to be regarded as the guiding principles in the judgment of tuberculosis carcases. The principle has been followed by regarding tuberculosis as in the main a localised disease).

In respect of pigs, the Committee recommends that the same standard of judgment be applied as to bovine carcases, and evidently is of opinion that the recommendations of the Royal Commission on Tuberculosis, to the effect that, owing to the greater tendency of generalisation in pigs, the whole carcase should be seized when evidence of tuberculosis exists, is unnecessarily severe.

A list is given of diseased conditions which should lead to total condemnation, together with instructions for dealing with localised disease.

The report represents a very valuable piece of constructive work, and Dr. Leighton—together with the members of the Committees associated with him in his enquiry—are to be congratulated on the results of their labours.

A decision has been reached by the Scottish Board of Health to issue regulations incorporating the recommendations of the Committees, and for this reason, as well as for the fact that the Report of the

Committees contains much information of value to all who are concerned with meat inspection, we would recommend that it should be carefully studied and should be kept available for reference.

OBSERVATIONS ON THE EGYPTIAN VETERINARY SERVICE.

THE Annual Report (1919-20) of this Department has recently come under our notice, the Director of which (Mr. Littlewood, M.R.C.V.S.) confines his remarks chiefly to statistics. The Report is well worth studying nevertheless, as showing the volume of work passing through the Department, and the obvious indispensability of the Veterinarian to the State. The non-statistical part of the report is concerned with the preventive treatment of rinderpest—or "cattle-plague," as it is called—perhaps from a laudable desire to de-kulturise our nomenclature—and it is evident that this disease is of primary importance in the long list of animal maladies with which the Egyptian Veterinary Service is required to cope.

Few graver responsibilities, indeed, rest upon the Government of any pastoral country than the efficient repression of this devastating disease, and the welfare of the inhabitants of the ancient land of Egypt is closely bound to-day—as it has been from the time of the Shepherd Kings—with the welfare of the ox and the buffalo, not only in respect of food, but also in those essential operations of husbandry—tillage and irrigation—upon which any population ultimately depends.

Rinderpest was a serious consideration to the Government of Egypt in the time of Moses; down to last year the same "very grievous murrain" was responsible for as many as 2,415 deaths—an increase of 888 cases over the previous year's record. This seems at first sight a big animal wastage from a disease which is now considered well within the control of science, but it is evident the Veterinary Department put up a stout fight, for as many as 46,110 animals were immunised by the double or simultaneous method (by which an active or permanent immunity is produced), a result achieved with the small loss of only 171 deaths, or ·37 per cent. of the total. Apparently this number (171) of deaths was not due solely to deaths from rinderpest, for a large percentage of the loss seems to have been incurred from the intercurrent disease (*piroplasmosis*) which is so difficult to guard against when the blood of one animal is introduced into the system of another. Texas fever seems to have been the main difficulty in this respect, and it is interesting to observe the fact that such cases were found amenable to injections of arrhenal (di-sodic-arseno-benzol).

Interesting details are given of the building-up of a serum herd for the production of immune-serum, such work being under the direction of Mr. Rabagliati, M.R.C.V.S. Provision is now made for the upkeep of 150 bulls in the Serum Institute, which Institute has already begun to issue large numbers of doses of immune serum of high anti-toxic value. Quantities are quoted showing that some 2,700 litres have been elaborated from about 6,700 litres of immune blood, a percentage of about 41·3 per cent. This strikes us as being rather a low yield, and it would be interesting to know the details of the technique employed. Bleeding directly into a decalcifying solution, and separating the supernatant plasma, should yield about 60 per cent. of the original volume. The fact that the plasma would contain a trace of the decalcifying citrate is immaterial in view of the fact that even repeated injections of citrates into the blood-stream fail to alter the calcium balance of the blood, or to act deleteriously in any manner.

Recent work in Australia has shown further that the red-cells abstracted in bleeding can with advantage be returned to the veins, rendering it possible thereby to make very large and repeated bleedings at short intervals without encountering any degree of anæmia—a factor which hitherto has determined the quantity of blood abstracted. Such facts are of importance to serum institutes, and should, if adopted, result in a much extended degree of usefulness.

The serum unit adopted by the Egyptian Rinderpest Institute is 50 c.c. based upon a dose of 1 c.c. of serum to 5 kilo of live weight. This unit, therefore, is one adapted for use in the case of the young animal of about 250 kilo, or say 565 lbs.

The Director speaks of the serious nature of the losses incurred in the fortifying of his serum cattle in the effort to enhance the degree of their immunity. The phenomenon known as *anaphylaxis* (" negative phase ")—or that often sudden and fatal collapse which attends the repeated inoculation of blood or other foreign proteid matter—is stated to have been responsible for the death of as many as fourteen of the serum herd.

Such losses—always unfortunate—are serious in proportion to the length of time and trouble taken in bringing the beast in question to a high degree of immunity, and losses from this cause are always regrettable to the scientist concerned. The recent valuable work of Besredka on this subject of *anaphylaxis* should be welcome to the

Egyptian authorities as showing how such serious losses may be avoided and how rapidly (a matter of a few hours only) an *anti-anaphylaxis* immunity can be established in an animal by appropriate modern methods.

While rinderpest bulks large in the Egyptian Report other diseases of great importance are also dealt with. Rabies—as one would expect—exists to a considerable extent, as many as 64 cases having come to light, while the precautionary slaughter of dogs is enormous. In Cairo alone 3,386 dogs and 5,815 cats were destroyed during the year, while in the provinces 43,352 canines and felines were poisoned. Our own "brown dog" pales in colour before such figures.

Glanders seems somewhat on the increase, 106 cases having occurred throughout the year as against 61 last year. Cairo is, as one would expect, the most heavily affected. Only 4,284 mallein tests seem to have been undertaken during the period covered by the Report, which, to those responsible for the clearing up of glanders after the Great War, seems a small number.

The disease *epizootic lymphangitis* is shown to be amenable to injections of nov-arseno-benzol (neo-salvarsan, or "914") and *hæmorrhagic septicæmia*, of which 135 cases were reported, has been treated or guarded against by 4,222 injections of preventive serum. The figures for mange (167) show that this disease is well in hand, in the horse at any rate, and it speaks much for the confidence which our professional brethren are inspiring in that as many as 1,340 camels were treated for mange at the request of, and on payment by, their owners.

We note also that *piroplasmosis* has been treated with success by arrhenal, and that some attempt has been made to strike at the root of this malady by the destruction of the tick, 838 animals having been "sprayed" for this purpose—a not very efficient method unless great care is taken to ensure complete saturation of all parts. It is a matter of some surprise that the use of the dip is not mentioned in this connection, but this great aid to veterinary administration will doubtless —to judge from the evidences of progressive and up-to-date treatment in other directions—soon come into its own.

The figures for tuberculosis are high, though lower than in the preceding year, being 3,108 as against 3,534, but the actual number of cattle and buffaloes has decreased by as many as 43,000, which may account somewhat for the lessened incidence.

Increase of live-stock, however, is shown in other directions, for the 1919-20 census shows 95,000 goats and 14,000 camels above the census figures for the preceding twelve months.

Sheep from the Sudan seem to be heavily affected with *œsophagostomes*, 720 such cases having been diagnosed (with many other morbid conditions) at the Pathological Laboratory of which Mr. Mason, M.R.C.V.S., is the Director.

Altogether the Report leaves an impression of sterling work being carried out by our *confrères* in Egypt.

We notice some small errors in scientific nomenclature. The unlovely hybrid "serumized" would appear to meet a fitting end by "anaphilaxis"—which latter, by its spelling, suggest an erroneous derivation. "Puerpural" for "purpural" is a curiously inapt term as applied to a morbid condition in a herd of bulls! But such points are trivial and do not detract from the value of the veterinarian's work as reflected in the pages of this Report.

In such a country as Egypt the field of the scientific worker is always "white unto harvest," and we congratulate the Director on the obvious and ample results of his Department's efforts.

The Civil Veterinary Service in Egypt has had probably a unique opportunity of carrying forward the standard of veterinary progress, owing to the fact that for a long period it has been operating over a comparatively small country. We are delighted that we are now beginning to be able to appreciate its progress, which, in our opinion, would have taken place earlier if the necessary driving power had been behind the efforts of its individual members.

ULCERATIVE LYMPHANGITIS IN RETURNED CANADIAN ARMY HORSES.

In the report of Dr. Frederick Torrance, B.A., D.V.Sc., the Veterinary Director-General for Canada, a note is made on the above subject, which again proves the value of competent veterinary inspection and advice; and also proves up to the hilt the wisdom of not having allowed the wholesale re-importation of army horses after the war. Only 105 horses were returned to Canada, and even although these were all officers' chargers, and presumably on that account had been under more care and careful observation than ordinary troop horses, five animals showed definite symptoms of the disease and had to be destroyed. All the others were kept in quarantine until the veterinary experts were satisfied that all danger of incubation and infection had passed.

Clinical.

SARCOPTIC SCABIES (OR ITCH) IN THE CHIMPANZEE.

BY A. W. NOEL PILLERS, F.R.C.V.S.,
Liverpool.

IT seems, from a survey of the literature, to be generally admitted that scabies in any of the Primates, other than man, is extremely rare; and I have not been able to find, after a lengthy search in our veterinary publications, any reference to the disease in the chimpanzee; neither could I see anything relating to it in *Review of Applied Entomology.* Several authors—Megnin (Les Parasites Articulés); Railliet (Traite de Zoologie Medicale et Agricole); and Schindelka (Hautkrankheiten) refer to scabies in wild carnivora and ruminants, but in no case is any account given of the parasite or disease upon the higher apes. Megnin, however, mentions (p. 438) that P. Gervais once found on a maki (lemur), which had died of mange, some sarcopts which resembled those of man, but upon whose specific identity he was not able to pronounce.

However, Mr. M. R. Johnston, for many years manager for Messrs. Bostock's, and now of the Zoological Department of the Blackpool Tower, informs me that the purchasing of chimpanzees from West Africa demands care, for many of them are affected with a skin disease. He states that attendants may take it upon the arms, but that with care and the use of sulphur ointment the disease upon the chimpanzee can be cured; it then soon disappears from the keepers.

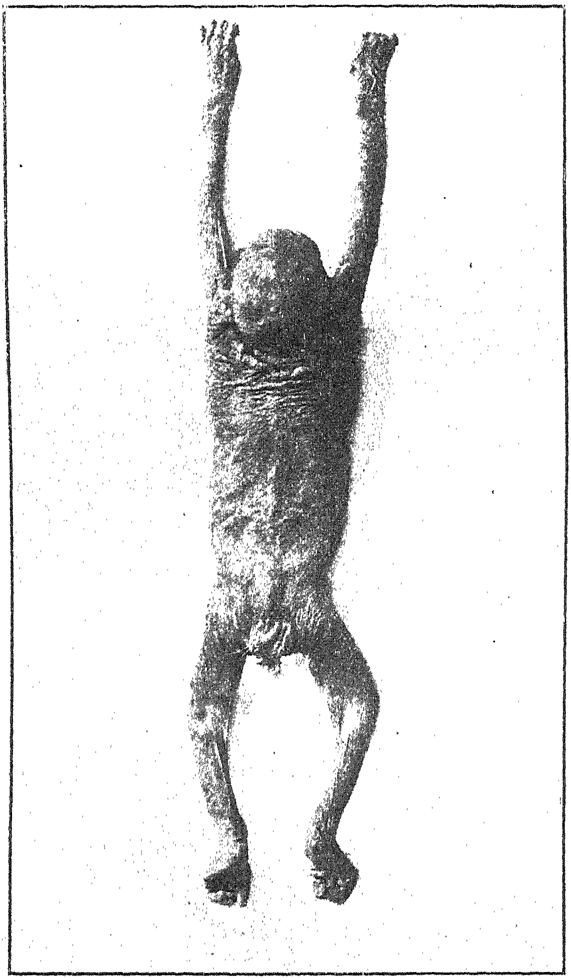
In view of these remarks the following case would seem worth recording, although the animal was dead when examined, and I have therefore nothing to say concerning therapeutic measures.

Some three months prior to death the animal, which was a female about two years old, was imported from West Africa. On its arrival it was stated to be suffering from a skin disease which the attendant seems to have regarded as "sugar eczema." The disease gradually increased in severity, the animal lost flesh, ate very little, and slowly "pined away."

On post-mortem examination, the body was emaciated, with very little adipose tissue in any part of the body. All the internal organs appeared to be normal with the exception of the lungs. These were affected with acute congestion. The small intestine contained 3 *Ascaris sp.*, the cæcum 4 *Trichuris sp.*, and large intestine 50-60 *Ozyuris sp.*

The long duration of the disease had completely masked the typical sarcopt lesion, there being on the affected areas either slight or marked accumulations of scab. Figs. 1 and 2 give a good idea of the extent of the disease, and Fig. 3 shows its advanced state across the top of the shoulders and structures adjacent thereto.

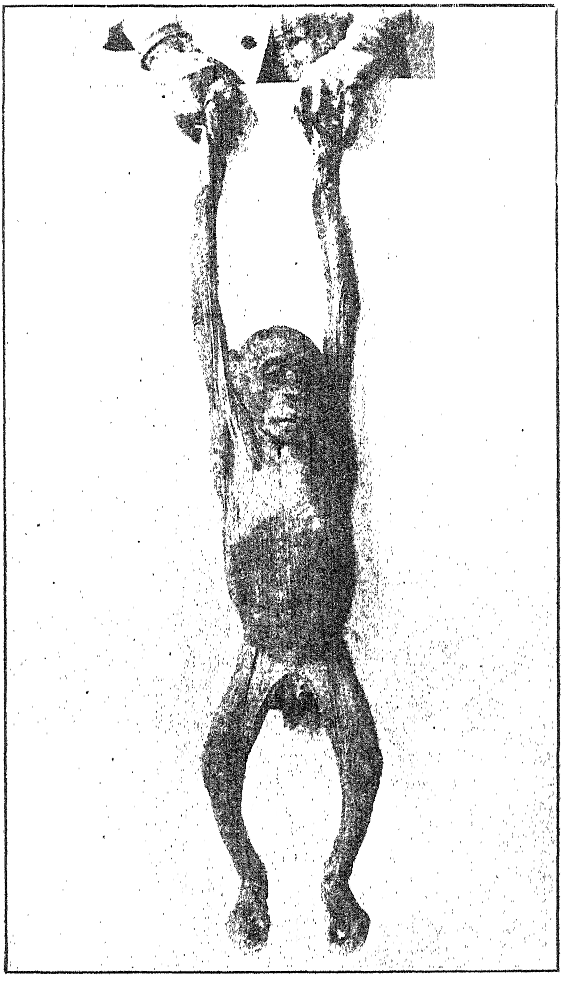
The lesions were widespread, and were either only very slight or completely absent on those positions which are the earliest areas to be affected in man, viz., between the fingers, on the ulnar border of the hand, on the wrist, on the palm of the hand, on the anterior border of the axilla and at the base of the thorax. The palmar surfaces of the hands were free, as were also the interdigital folds. On the back of the right hand the lesions were diffuse and became aggravated around the origin of the thumb. The left hand



Photo] [*M. Brown.*

FIG. 1.—Dorsal Aspect.

was similarly affected but to a lesser degree. Continuing up the extensor surfaces of the arms the severity became much less at about half-way up the forearm, only to increase again just above the elbow.

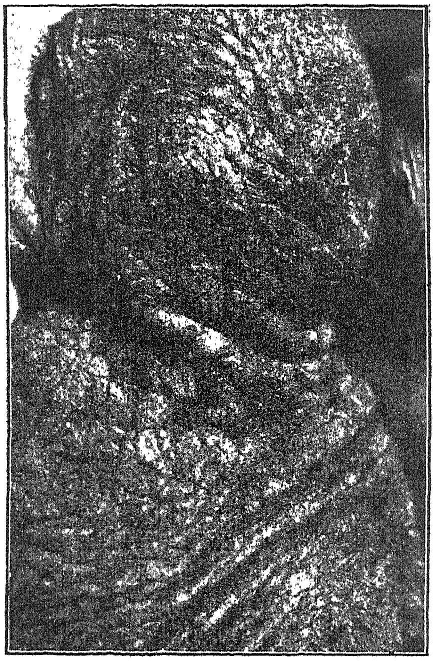


Photo] [*M. Brown.*

FIG. 2.—Ventral Aspect.

At the shoulders, back of the neck, and scapular regions the skin was greatly thickened by marked accumulations of scab, with deep cracks and corrugation. At places there was moisture resulting from the exudation of serum and pus. From the lower aspect of the shoulder-blades, the disease became less marked, but again increased at the buttocks. From here there were only a few odd or scattered lesions down to the ankles (see Fig. 1). On the scalp the disease started about three inches behind the orbital ridges, and gradually increased in severity as the occipital region was reached. The external ears were markedly affected (see Fig. 3).

Generally speaking, with the exception of an odd spot or two, the flexor surfaces of the arms, the chest, abdomen, inside the thighs and the external genitalia were free. At the knees there were some definite lesions and these continued a little way down the region outside the fibula. A few areas of disease occurred across the metatarsal regions, but the folds of skin between the toes and soles of the feet were free (see Fig. 2). It will be noted that the whole body shows a marked loss of hair. The sarcopts could easily be seen with the lens, in crusts from the shoulders, and were isolated from several other parts. I am indebted to Miss A. M. Evans, M.Sc., for the following measurements, and to the Liverpool School of Tropical Medicine for permission to publish the photographs.



Photo] [*M. Brown.*

FIG. 3.—View of Scalp, Ears, Neck, and Shoulders.

SARCOPTES SP. FROM CHIMPANZEE.

Stage of Parasite.	Greatest Length in mm.	Greatest Width in mm.	Average.	
			Length in mm.	Width in mm.
Ova 1	·18	·1		
2	·16	·08	·17	·09
Larvæ 1	·17	·15		
2	·20	·17		
3	·18	·16	·183	·16
Nymphæ 1 ...	·20	·19		
2 ...	·24	·21	·22	·20
Pubescent females 1	·31	·30		
2	·33	·30	·316	·296
3	·31	·29		
Males 1	·14	·17		
2	·22	·20	·226	·19
3	·22	·20		
Ovigerous females 1	·50	·37		
2	·37	·31		
3	·37	·31	·41	·332
4	·40	·34		

ENDOCARDITIS IN THE HORSE.

By CHAS. POWELL, M.R.C.V.S.
Woburn.

Subject.—A half-bred colt rising two years old.

History.—I first saw the case on Christmas Eve. The colt had done well and appeared in good health up to about six weeks previous to this. He was then noticed to be standing apart from the others, moved stiffly, showed dulness and began to lose condition. The owner thought the colt had contracted a cold, so fetched him home and housed him. The colt had been at pasture on some local moors and the owner had suspicions that some horses in neighbouring fields had had strangles, but no history of any previous illness of the subject could be obtained.

Symptoms.—Dulness, slight cough, dry and short in character. Marked œdema of sheath, abdomen and hind legs, chiefly in the hock region. Temperature, 102.6; pulse, 84, small and weak; respiration 26 and chiefly abdominal. Mucous membranes slightly pallid and of a dirty tinge.

Auscultation revealed dulness on both sides of the thorax, with rãles on the right. The heart's action was very pronounced and valve sounds distinct, but no murmur could be detected until a day or two before death, when a distinct murmur took the place of the first sound.

Heart disease was diagnosed and prognosis was hopeless, but at owner's request treatment was tried. The colt lingered on for eight days and was found dead in the box, feeding fairly well practically up to the last.

Post-mortem revealed dropsical effusions in the swollen tissues. The heart was dilated, muscle soft and flabby and of a dirty white colour. The right ventricle contained very large vegetations both on the valve and wall, but especially on the latter. These were very firm and on section showed degenerative centres. The tricuspid and aortic valves were normal.

The lungs were œdematous and of a dirty green colour, but there was no evidence of pneumonia or pleurisy.

The stomach contained plenty of food. Large numbers of bots were present both in this organ and the duodenum, the great majority of which had become detached from the walls.

There were numerous strangles in the colon. No aneurism of the anterior mesenteric artery by these could be detected, although the wall showed evidence of a slight previous arteritis. Both the liver and kidneys showed marked degenerative changes.

PYO-SEPTICAEMIC INFECTIONS IN NEW-BORN ANIMALS.

By L. C. MAGUIRE, M.R.C.V.S.
(*Fairford, Gloucester*).

HAVING read with great interest the article "Bacillus Coli Infections in the New-Born Foal," by Prof. Gaiger and Mr. T. Dalling in the VETERINARY JOURNAL for August, 1921, I feel it is my duty to publish my clinical experience in a form of prophylactic treatment based exactly upon the same theories as those formulated by the above writers. In 1916 I commenced the treatment I am now about to briefly describe, and which I have fully dealt with in my book, "Aids to Serum and Vaccine Therapy in Veterinary Practice," now in the publishers' hands. White scour in new-born calves was very prevalent on several dairy farms in my practice; notwithstanding every hygienic precaution being adopted, the disease continued to persist. It was mostly of the acute form, the calves dying in some cases at, or within, forty-eight hours after birth. The post-mortem symptoms were those of a septicaemia, and in some instances, especially on certain farms, the disease was more chronic. Bacteriological examination of a number of the dead animals revealed mostly organisms of the colon type, in some instances para colon type organisms were also present. These bacteria were, in most cases, isolated from the joints and other organs. From each farm on which the disease was present I succeeded in obtaining a leg for bacteriological examination. As the organisms were isolated I had a vaccine prepared. Knowing the strict specificity of the colon bacillus, I considered it necessary to have a separate vaccine prepared from the bacteria isolated from each post-mortem specimen taken from the different farms where the disease existed. As the colon bacillus is a common inhabitant of the intestinal tract of animals, and is benign under ordinary conditions, I presumed that the organisms whose virulence had become exalted and was responsible for the disease in the new-born calves were of the same strain on that particular farm, irrespective of the number of animals affected. As new-born animals have no powers of immunity, I sought a means to establish immunity prenatally, working on the hypothesis that any immune bodies circulating in the humoral contents of the maternal body would be transmitted by way of the blood stream to the fœtus, thus giving the fœtus a post natal-immunity. Although this immunity must of necessity be only of the passive kind yet it is sufficient to protect the newly born animal against the immediate post-natal infection by the organism against which the immunity is established. My method of treatment was as follows:—Having prepared a separate vaccine from the organisms found on each separate farm, I treated the pregnant cows with these vaccines. The vaccination should be carried out in the seventh and eighth month of pregnancy, as abortions may occur if vaccinated later. I gave three injections at intervals of ten days. First injection contained ten millions dead bacilli; second twenty-five millions, and third fifty millions. The cows did not suffer much inconvenience from these injections—for eight hours or more the animal was a little dull, but this soon passed away. By this method I have completely eradicated white scour from eight dairy farms, the average number of cows on each farm being fourteen, making a total of 112 cows vaccinated. Before this treatment was instituted 40 per cent. of calves born on these farms became affected with white scour. One week after birth each calf received a dose of vaccine, dose being quarter of initial dose employed for the cows. I consider this method of protective treatment in the newly born calf excellent, and am positive it would give similar results in foals. The only disadvantage attached to this treatment is that a separate vaccine must be prepared for each farm, and that at least one animal must have become affected before the specific bacillus can be obtained.

PROLAPSUS UTERI IN THE MARE.

By W. T. HEWETSON, M.R.C.V.S.,
Brampton, Carlisle.

THIS accident occurs much less frequently in the mare than it does in the cow, and is looked upon by all writers on the subject as being much more serious. This, no doubt, being due to the greater susceptibility of mares to septic infection.

During practice I have only met with six cases in mares that had not previously died from internal or external hæmorrhage due to the accident, and all the six cases treated recovered. This might be due to some extent to good fortune, and not to any special skill or treatment on my part. Nevertheless, it may be of interest if I record one or two cases and the mode of treatment.

Case 1.—I was called eight miles away to a mare that was unable to foal. On arrival I found the mare had foaled, but the uterus was hanging down nearly to the hocks. The walls of the loose box were here and there besmeared with blood, having been rubbed with the inverted portion. I looked upon the case as being very serious, and did not consider there would be much chance of recovery from what I had been taught, and from what I had read.

A supply of warm water was procured, and a dessertspoonful of Jeyes fluid was added to three gallons of the water, the water being not more than new milk warm. It is important that the water is not too hot. It should err on the cold side. Water at 95° F. is suitable for the purpose. The water used should not contain too much Jeyes or sanitary fluid, as this acts as an irritant, causing the patient unnecessary pain, as the genital organs are very delicate and extremely sensitive, and any irritation of these has a very deleterious and depressing effect upon the patient.

After cleansing and washing the inverted portion with the disinfectant water I returned it. This I found much easier done than returning the inverted womb of a cow, which is often difficult. In the mare the vulva is larger and easier dilated, and the pelvis is wider. When I had returned the inverted portion I could not satisfy myself that it was completely returned to its normal position. Fortunately the farmyard was situated on a hill, and the road leading from it to the main road had a good decline. I had the mare led to the top of this road and placed with her fore feet down the hill, and her hind quarters were thus elevated. To restore the inverted portion completely I filled the womb with the prepared asepticised warm water by the aid of 4 ft. of hose piping and a funnel. The mare was then walked down the hill so that the weight of water in the womb would cause it to return to its normal position. The water was expelled from the womb as the mare returned. The filling of the womb was repeated once more and the mare then led into the loose box and covered with a rug. A laxative ball was then given, viz., 6 drachms of aloes. Six powders, containing ʒss. each of pot. nit. and pot. chlor., were left, one to be given each day in soft food. The owner was advised to feed the mare sparingly on laxative diet.

Case 2.—Occurred in a mare that was unable to give birth to her foal. I was in attendance about 6 a.m. The foal was born alive, and the mare was left apparently all right, but not cleansed. About 9 a.m. the mare was found lying in the loose box with the womb inverted and the placenta still attached. I did not get back to my patient until 12 o'clock noon. The inverted portion of the womb was by this time anything but clean. As the mare was lying down a sheet was placed under it. The placenta was now removed and the womb washed as clean as possible. This being done, the mare was got to her feet and the womb returned. She was then walked into a field close by, where there was a hill, and led to the top of this. The womb was now filled with disinfectant water, as in the previous case, and the mare walked down the hill. When going down the mare went slowly and reluctantly, but when returning she came back very quickly, the water being expelled on her return. In this case the womb was filled with water three times and the mare taken three times down the hill.

The medicinal treatment was the same as in the previous case. She was visited each day for three days, and the womb was washed out in the ordinary way. The mare recovered without developing any other results.

Case 3.—I received a message to attend a mare with her womb down on a farm fourteen miles away. Ten miles of the distance was travelled by road, and the remainder I walked, being escorted across the fells until we came to a solitary farmhouse. Here I found my patient standing in a loose box, perspiring and trembling all over, with an anxious expression. Some soft food had been placed in the crib, but of this she took no notice. The womb had been put up by the owner. On examination I found it was not completely returned to its normal position. A quantity of warm water was procured and a dessertspoonful of Jeyes fluid was added to a bucketful of water. I had with me 4 ft. of hose piping, but I had not a funnel. Fortunately the owner had an old gramophone horn that answered the purpose admirably. The mare was led on to the top of a hill close by and the womb filled with water, as in the previous cases, and she was walked down the hill with her womb filled three times. It takes about three bucketfuls of water to fill the womb. The mare was then led back into the loose box. By this time the trembling had ceased, and the mare went direct to the crib and began to eat, showing she had received relief from the means adopted to restore the womb to its normal position.

The same medicinal treatment was prescribed as in the previous cases. I only saw this mare once, yet she made a good recovery.

In all the cases there were not any means used to prevent the uterus from again being inverted. In my opinion there is not any need of a truss or clamp providing the inverted womb, in the first place, is completely returned to its normal position. If this is not, or cannot be, done, then the patient is inclined to press and strain.

The three cases recorded occurred in ordinary Clydesdale mares, so the dose of aloes would need to be regulated according to the size of the patient and the district where situated. It is important to open the bowels, as this tends, in my opinion, to prevent swelling of the injured parts, and I am convinced that in most cases of inversion met with in the cow the bowels are constipated, and this is often the cause of the inversion. A dose of laxative medicine given to cows immediately after the womb is returned prevents straining, and I am convinced the same applies to mares.

TYROTOXICON POISONING IN A LITTER OF PUPS.

By MAJOR H. ALLEN, M.R.C.V.S., R.A.V.C.,
Saharanpur, India.

Tyrotoxicon, a poisonous ptomaine, said to occur in stale cream, cheese and milk products.

History.—A litter of eight pedigreed Irish terrier pups (4 dogs and 4 bitches) were "whelped" by a bitch of mine April 15, 1921.

I transferred the four bitches to a foster mother on April 18, 1921, and also started giving them a milk preparation called "Lactol," mixed in cow's milk, twice daily, concurrently with the milk from the foster mother.

As the foster mother did not seem to be giving a sufficient quantity of milk, I allowed them to be suckled by a goat, four times daily, from May 3, 1921.

The four dog pups were suckled by their mother from date of birth, and started with the goat, besides their mother, on May 3, 1921, three times daily, *but never received any "Lactol."*

Result.—Two bitches died on May 12, 1921. One bitch died on May 14, 1921. One bitch died on May 15, 1921.

Symptoms.—(i) Tongue and gums a dead white; (ii) staggering gait; (iii) emesis and tyrosis (curdling of milk in stomach) during final stages; (iv) semi-comatosed condition; (v) urine and fæces scanty; (vi) dysphœa, convulsions, prostration, complete coma, and death.

Post-mortem.—(*a*) Enlarged liver, weighing two ounces. (*b*) enlarged spleen, weighing one ounce; (*c*) enlarged kidneys, 1¼ drachms each; other organs healthy. One case showed slight congestion of right hemisphere of brain.

Treatment.—Castor oil and stimulants.

Remarks.—I purchased two tins of "Lactol" in January, 1920, and weaned a litter of pups, born December, 1920, with it, with very satisfactory results. I had a balance of half a tin left over.

The "Lactol" used on the litter of May 15, 1921, had consequently been with me for over a year. Its colour was pale yellow, and it gave a decidedly strong cheesy odour.

Enquiry.—Am I correct in attributing death to Tyrotoxine formed by the "Lactol" undergoing putrefaction by decomposition, or by bacterial metabolism? I am confident in my belief in regard to the former owing to the fact that the four male pups are, at the time of writing, all big and healthy. They are being weaned on "Virol" twice daily, in addition to the goat, to which they are put four times daily, as their mother is drying up rapidly owing to the heat.

A STRANGE FOSTER MOTHER.

By NEIL A. McEWAN, M.R.C.V.S.,

Wigtown.

It is curious how the maternal instinct will develop itself, and numerous cases have been authenticated of one species of animal suckling the young of another; in the VETERINARY JOURNAL of October last year there was a photograph of a bitch of the Alsatian breed suckling six small pigs.

An equally extraordinary instance, of which I enclose the photograph, has come under my own personal observation, and relates to a ewe which adopted a young pig. She had lost her lamb, and the young pig went to her voluntarily. From the first she took to it and allowed it to suck, the little pig squatting on its haunches in a sitting down position to do so.

She protected it most jealously against any projected interference on the part of the other ewes, and in the cold spring weather, when the ground was cold, the pig slept on the ewe's back. At the present time the pair are now on the hillside at pasture with the rest of the flock. It is weaned and weighs about three stone, being in perfect health and slightly heavier than the other members of the same litter.

Abstracts.

CONCERNING A FREE-MARTIN.

By Colonel Sir ROBERT FIRTH, K.B.E., C.B.

A friend of mine who goes in for breeding cattle showed me recently one of those mysterious and somewhat uncommon quadrupeds known as free-martins. The animal in question was an apparently sterile cow born co-twin with a potent bull. My friend, who is a very intelligent layman, amused me much with his comical explanation of the unwonted birth of the animal; into those explanations I need not enter, but, having dabbled a little in genetics, I was able to give him a more scientific explanation of the occurrence, and as the matter has a general bearing on the theory of the differentiation of sex it may be of interest to readers of this journal.

To begin with, I premise that the reader is more or less familiar with the Mendelian phraseology, and, therefore, would say that a free-martin is a pure or extracted recessive in respect of its genital determinants, and that the potent twin is a pure or extracted dominant, both being of F^2, in the Mendelian scheme. If the reader be unskilled in recent embryological theorizing, this statement may seem not very helpful, but it will be more comprehensible if it be borne in mind that there is reason to think that, in humans and the vertebrates generally, the female and the male have each not only characteristic sex organs fully developed, but also traces of those of the opposite sex. The conclusion is drawn that the ova and the spermatoza are gametes, each of two types ; thus there are two male gametes of unequal value and two female gametes also of unequal value. One male gamete contains the male-sex-unit character, and one female gamete has the female, sex-unit character ; consequently we may speak of a male sex gamete and a male non-sex gamete, and of a female sex gamete and a female non-sex gamete. A further hypothesis is that the crossing of a male sex gamete with a female non-sex gamete will give a fertilised ovum or zygote which will develop into a male holophyte or fully developed organism, and that the crossing of a female sex gamete with a non-sex male gamete will give a female holophyte—the sex being determined and unalterable as soon as the zygote is formed.

According to modern teaching, in the male genital unit there are potent and dominant male elements, as represented by the testes, the phallus, prostate and prostatic urethra, scrotum, Wolffian ducts and Wolffian bodies, the gubernaculum and the caudal ligament of the testis ; while the non-potent or recessive elements in the male are the mammæ, the prostatic utricle, fimbriated ends of Fallopian tubes and the paradidymis. The female genital unit is also represented by potent or dominant female elements and non-potent or recessive female elements. Among the former are the mammæ, ovaries, ovarian ligaments, Fallopian tubes, uterus, vagina, hymen and urino-genital sinus. In addition to the foregoing, the round ligament, labia major and minora, and the glans, are potent and dominant female elements, less fully developed than in the male, but always analogous to a definite continuous segment of the corresponding male organs. On the other hand, the epoöphoron and upper portion of the Wolffian duct, which are equivalent to corresponding fully developed organs in the male, but less perfect in structure, and not equally functional, are regarded as non-potent or recessive female elements.

The practical interpretation of these genetical hypotheses or views is that a free-martin is not a hermaphrodite, but may be one of two types. If born co-twin with a potent bull, such as was the beast belonging to my friend, it is really a sterile male, and, according to the Mendelian scheme, would have originated in the following way. A male sex gamete united with a female non-sex gamete and gave a zygote F^1; this, owing to it twinning, gave a bull with equivalent soma and dominant or potent genital organs and a bull with equivalent soma and non-potent genital organs of the female and recessive type. These twins constitute F^2 in Mendelian language, and were the potent bull and the free-martin respectively, the former being a pure or extracted dominant and the latter a pure or extracted recessive and really a sterile male. The other and much rarer type of free-martin is the one born co-twin with a potent cow, and which really is a sterile female. The originating elements in this case being a non-sex male gamete uniting with a female sex gamete. Apart from the question as to how free-martins originate among cattle, the hypothesis of varieties of gametes and the distinction of the genital organs into dominant and recessive or potent and non-potent parts or representatives affords an explanation of the presence in one sex of rudimentary organs of the other as well as of the occurrence of the strange structures known as teratomata or embryomata. The view held generally is that a teratoma arises from a non-sex variety of gamete, that is, that the testicular teratoma is derived from an imperfectly reduced non-sex male gamete, and the ovarian variety from an imperfectly reduced ovum. Obviously, the whole subject is both intricate and difficult, requiring close study and a working knowledge of Mendel's law in all its ramifications; but it would seem that, little by little, some of the most mysterious phenomena of generation and its anomalies are being better understood, and that there is a reasonable hope of disorder being reduced to order and an explanation forthcoming of many matters regarded hitherto as inexplicable. Anyone wishing to pursue this subject further will find a suggestive article on differentiation of sex by Berry Hart in the *Transactions of the Edinburgh Obstetrical Society*, vol. xxxiv, pp. 303 to 357, and for additional anatomical knowledge as to free-martins the same worker gives much information in *Proceedings of the Royal Society, Edinburgh*, vol. xxx, pt. 3, pp. 230-241.—*Journal, R.A.M.C.*

POISONING OF CATTLE BY FEEDING ON OLD MEALIE LANDS.*

By D. T. MITCHELL, M.R.C.V.S.,

Acting Director of Veterinary Research, Veterinary Research Laboratory, Onderstepoort.

DURING recent years, in various parts of Natal, a number of cases of paralysis in cattle have occurred when the animals have been allowed access to mealie lands for grazing purposes in the latter part of the winter.

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* This article, taken from the May number of the *Journal of the Department of Agriculture* (Union of South Africa) is of interest, as the symptoms are similar to some which have occurred from time to time in Great Britain from feeding on mould infected grain.—(Ed. *V.J.*)

It is customary in Natal, when harvesting mealies, to discard all badly formed cobs, which are either left on the stalk or dropped on the ground. In this way, when cattle are changed to old lands, there are lying around considerable numbers of old and damaged cobs which have been exposed to the weather for some months, and these are readily eaten by the cattle. Owing to this, and to the fact that the cobs are found in many of the districts in a very mouldy condition, it has been suspected by farmers, in areas where the paralysis among cattle occurs, that this condition is due to cattle eating a large quantity of these diseased mealies. Positive experimental evidence on the subject was, however, lacking. Feeding tests carried out at the Veterinary Research Laboratory, Pretoria, with material (mealies on cob) obtained in the Ixopo Division, Natal, failed to give any positive results. The animals used in these experiments were two sheep, two goats, one calf, and one mule. The experiments were continued for three weeks, during which time the calf, sheep, and goats received an average total of 33 lbs. of cobs per week, and the mule 15.5 lbs. per week.

During the last five weeks of the tests soaked mealies was given. One heifer was fed on a culture of the fungus grown on crushed maize from one to one-and-a-half months; this animal consumed 23 lbs. of this material between March 19 and 31. No symptons other than a slight loss of weight could be observed in any of the animals under observation.

From the subsequent experiments on Diplodia-infected maize it would appear that the quantities fed at Pretoria were too small to produce effects, or, what is more probable, that the supply of cobs forwarded for experiment contained only a small percentage of infected grains.

Reference to these experiments will be found in a pamphlet* published by Dr. Van der Byl, of the Division of Plant Pathology.

This pamphlet gives a detailed description of *Diplodia zea*, with photographs of infected maize cobs, and should be consulted by those interested in the feeding tests referred to herein.

From these previous experiments it was concluded that the maize so infected had no harmful effect on animals to which it was fed.

Although these results were fairly conclusive, the experience of many farmers pointed definitely to the harmful results of allowing

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*"Preliminary Investigation of the Deterioration of Maize infected with *Diplodia Zea* (Schw.), Lev," from the Transactions of the Royal Society of South Africa, Vol. IV., Part 3, 1915.

cattle to graze in mealie lands where cobs were abundant and which, for the first few days at any rate, constituted almost the sole article of diet.

For this reason it was decided to commence a series of experiments at the Maritzburg Laboratory, utilising mealie cobs obtained from farms where the disease had recently occurred.

Through the assistance of Mr. Power, Senior Veterinary Surgeon, Natal, sufficient material was obtained for the tests from various farmers in the Estcourt Division. Some cobs were forwarded to the Government Botanist, Pretoria, for determination of the infecting fungus present, and were reported on by him as follows : " The mealie cobs referred to in your minute of September 30 last are infected with the fungus *Diplodia zea.*"

For the tests four oxen were selected which had been on the station for about two years and had been fed only on grass in the paddocks adjoining the laboratory. These animals were about five years old and in good condition. During the experiments they were tied up in the stable and watered by hand with water obtained from the river close by. The mealies on the cob were fed as received from the farmers, but in all cases the mealie grains only were eaten, the central core being rejected. It is, therefore, difficult to say definitely what weight of material was actually eaten.

Quantities of material fed :—

Ox No. 88	360 lbs.
Ox No. 90	270 lbs.
Ox No. 94	225 lbs.
Ox No. 87 .. .. .. *ad. lib.*	about 145 lbs.

Of these four animals one ox did not show any departure from the normal, and the remaining three developed typical symptoms.

GENERAL NOTES ON THE EXPERIMENT.

With the exception of Ox. No. 87, the feeding on the mealie cobs was discontinued as soon as the first symptoms were shown. In the case of Ox No. 87 the feeding was continued up to the time of death. It is considered that had the feeding of cobs been discontinued when symptoms of improvement were shown death would not have ensued. In the other animals under experiment no medicinal treatment of any sort was administered, and the recovery in their case is attributed to the fact that as soon as the first symptoms of paralysis or inco-ordination of movement were first observed the animals were not given any more mealie cobs. The additional ration of sugar-cane which was administered in their case could not be supposed to have any special curative influence other than that exercised in general by the good nursing which was accorded to the cattle. The amount of cobs fed to the experimental animals was considerable. In the case of Ox No. 87, it was observed that although this animal consumed the smallest quantity it was followed by fatal results, and that although a similar quantity of mealie cobs of the same lot was fed to animal No. 94 this animal recovered. The effect produced would doubtless depend on the degree of infection of any particular lot of cobs with fungus, but in view of the above-mentioned fact it would appear that the particular idiosyncrasy of the animal was also a determining factor.

The general health of the animals in experiment did not seem to be greatly affected. The appetite was well maintained, and with the exception of a slight degree of diarrhoea in the earlier stages no derangement of the stomach or intestines could be noted. In the latter stages constipation was present.

Practically no elevation of temperature was noted, and it was on this account, associated with the fact that the appetite was maintained well throughout, that there was such a slight loss of condition in the animals during experiments.

The foregoing experiments demonstrated conclusively that the feeding of oxen with mealie cobs infected with *Diplodia zea* produced a condition in the laboratory experimental animals which was indistinguishable from that occurring in cattle which gained access to mealie lands, and it was therefore concluded that the conditions were one and the same. As it was still not possible to say what was the actual exciting cause of the intoxication—whether it was due to the fungus, to the products of its metabolism, or to alterations in the starchy content of the grain on which the fungus was growing—a series of experiments were therefore undertaken to elucidate this point.

Through the kindess of Dr. Van der Byl a pure culture of *Diplodia zea* was obtained and a number of preliminary experiments undertaken in order to ascertain under what conditions the fungus could be grown in bulk on maize, etc.

After some preliminary work it was found that the *Diplodia* would grow well at 27° C. in Mason's jars filled with sterile crushed maize. The lids of these jars had a half-inch opening drilled through to allow for inoculation of the medium with fungus spores. Growth was allowed to proceed for two months.

NOTES ON THE EXPERIMENTS.

Of the three animals which partook of the culture of *Diplodia* on sterile maize in quantities of 20 lbs. each two developed symptoms.

These symptoms resembled those produced by feeding on infected cobs, but the onset after the commencement of feeding was shorter, and the symptoms were much more acute. The period during which clinical symptoms remained was shorter and recovery more rapid. These differences can be accounted for by the fact that the animals received a large dose of more highly concentrated material than was the case in the cob-fed animals.

The absence of symptoms in one ox may have been due to a tolerance resulting from an attack in the preceding year.

CONCLUSIONS.

From these experiments it was concluded that a condition indistinguishable clinically from that produced by feeding on infected cobs or occurring naturally in infected mealie lands could be set up by feeding on a culture of *Diplodia zea* grown on sterile maize.

Further experiments were carried out to determine whether allied species of fungi (mucor) grown under identical conditions would produce similar symptoms and whether *Diplodia zea* grown on a cellulose medium would give rise to the condition when the medium was fed.

All these experiments gave negative results.

GENERAL CONCLUSIONS.

(1) That a disease in cattle characterised by inco-ordination of movement and paralysis is set up by feeding on mealie cobs which are infected with *Diplodia zea.*

(2) The cultures of *Diplodia zea* grown on sterile maize when fed produce clinical symptoms indistinguishable from those set up by feeding on infected cobs.

(3) That the intensity of the symptoms and the mortality depend upon the quantity fed and on the percentage of infection present in the grains.

(4) That cultures of allied species of fungi grown on maize are incapable of setting up similar clinical symptons.

(5) That the casual factor is not the fungus itself, but must be looked for in the material which is formed as a result of the interaction of *Diplodia zea* during its development in the starchy content of the maize grains.

GENERAL DESCRIPTION.

The following is a brief description of the disease as it occurs under veld conditions :—

Geographical Distribution.—In Natal the reports of the presence of the disease would appear to be limited to the high veld parts of the country, and in these areas the occurrence of a disease in cattle resembling this condition has been very common during the last two seasons. In most cases it has been impossible to entirely eliminate all other factors, such as poisoning by poisonous plants, etc., owing to lack of opportunity to investigate each outbreak reported, but it may be taken that cases of the disease have occurred in most of the high veld mealie-producing centres of Natal. The losses were most severe during the season preceding these experiments in the Estcourt Division, and it was from this district solely that the material was obtained for experimental purposes. Reports of a few outbreaks have also come to hand from the Ixopo Division, but material obtained from this district failed to reproduce the disease in animals at the Research Laboratory, Onderstepoort.

Seasonal Occurrence.—The disease is limited to the late winter months, July to September. This is the period when veld grazing is very scanty, and it is the custom for farmers to turn their cattle at this time into the mealie lands for better food.

Animals Affected.—The disease is limited to cattle, animals of all ages and sexes being equally susceptible. Some reports have mentioned the fact that sheep were also susceptible, but up to the present it has not been possible to confirm this. Horses, mules and donkeys would not appear to be susceptible, as these animals graze over the same area where cattle are dying of the disease without suffering any harmful results. No cases have been recorded of goats or pigs having been affected.

Cause.—The disease is only found associated with mealie lands, and it is popularly supposed by the farmers of the affected areas that it is caused by feeding on mealie cobs which have lain for some months on the ground. In the experimental investigations mealies which had been subjected to these conditions were found to be capable of producing a similar train of symptoms, and this supports the opinion of the farmers. Examination of the cobs fed revealed the fact that a very great percentage were infected with the fungus *Diplodia zea*. Experiment evidence has shown that cultures of *Diplodia zea* in sterile maize when fed to animals can set up clinical symptoms which are similar to those shown in animals contracting the disease naturally, and further experiments indicate that the results are produced by a substance of, at present, unknown composition formed during the growth of the fungus in the maize grains.

TIME AFTER EXPOSURE AT WHICH THE FIRST SYMPTOMS ARE SHOWN.

In natural conditions in the veld, cases have been known to occur in six or eight days after the animals were placed in the lands. In the laboratory experiments the shortest time which elapsed between the commencement of feeding on the cobs until the first symptoms were shown was three days and the longest fifteen days. The animal which developed symptoms in three days was a very ravenous feeder, and this may account for the short time which elapsed before symptoms were shown. It may be taken that the development of the symptoms depends on the quantity eaten and the condition of the cobs with reference to their degree of infection by the fungus.

Symptoms.—The first symptoms noted are lachrymation and salivation accompanied by slight quivering of the muscles of the flank and shoulder. The back is slightly arched, and the animal stands with its legs farther apart than normal. The head is carried low and the ears droop slightly ; the faeces are mostly soft, but no diarrhoea is present. In this stage, if the animal is walked, only slight symptoms of inco-ordination of movement are to be noticed. Later, these symptoms are aggravated—profuse salivation and lachrymation are apparent—muscular tremors become general. The coat stares, back is very much arched, and the animal has a dejected appearance. Progression is slow and the animal only walks when compelled to do so. Symptoms of inco-ordination of movements are evinced by high stepping of the legs. Lateral swaying of the body and sometimes a tendency to progress with the hindquarters bent to one side. The animal falls after walking a short distance, unless supported. These symptoms last for about one or two days, after which the animal is unable to rise without assistance, and when lifted stands with the legs wide apart and the head down, and showing irregular spasmodic contractions of the leg muscles. The tail is flaccid ; on walking the animal knuckles over at the fetlocks of both fore and hindlimbs, frequently plunging head foremost on the ground after a short distance. Sensation is retained in the muscles. Rumination is suspended, but the animal feeds occasionally and drinks fairly well. If cobs are still administered to the animal the symptoms become more pronounced, and soon the animal is unable to stand on being lifted. It remains lying on the ground, feeding occasionally. Constipation now ensues, the faeces which are passed being coated with mucous, which is blood-tinged. Death is preceded by a complete loss of tone of the muscles, the animal lying stretched out and comparatively limp.

If feeding on the mealie cobs is discontinued when well-marked clinical symptoms develop, recovery is fairly rapid. The appetite returns and the animal feeds on green stuffs freely. The symptoms of paralysis disappear in a few days, but stiffness in movements persists for some time. In one case which recovered, knuckling over at the fetlocks continued for over a week when other symptoms had disappeared and the animal developed a bony callus on the anterior aspect of the fetlock joints of the fore legs.

The temperature shows practically no alteration throughout the illness. The pulse is early affected, becoming rapid and thready, and in the case which terminated fatally almost imperceptible for the last two days of life.

Lesions on Post-Mortem.—In one case which was available for examination the chief lesions present were a well-marked catarrhal enteritis, affecting the small and large intestines. Acute diffuse hyperaemia of both kidneys and well-marked congestion of both lungs.

Mortality.—The mortality varies considerably on the various farms. In some, practically all the animals which develop symptoms succumb, while in others a large percentage recover. It would appear that the mortality is greater in the latter part of the season.

Treatment.—No treatment was adopted in the case of the animals which recovered and in which the disease had been artificially produced, other than good nursing. It is necessary to remove the animals at once from the lands as soon as the initial symptoms appear. Affected animals should be given a saline purge, so as to empty the intestines of ingested irritant material. The animal should, if possible, be housed and given some green food, or if none is available an addition of a daily dose of linseed oil to the ordinary food is indicated.

Prevention.—Collection of all damaged cobs at the harvesting should be practised. As the suspected causal fungus is most prevalent in old mealie lands these lands should be allowed to lie fallow for a season or, if this is impossible owing to lack of other suitable agricultural lands on the farm, strong measures should be adopted to get rid of the fungus itself on the lands. In view of the fact that the fungus had been demonstrated in the stalks as well as in the cobs, it would be advisable to burn off all the vegetation in the lands as soon after the mealies are harvested as was possible. By this means, complete sterilisation of the whole area would be ensured, and in the following season the cattle might be allowed access to the mealie lands with safety.

It is strongly recommended, however, whatever general treatment of the lands is carried out, that on succeeding years *all* cobs should be harvested.

THE MISUSE OF FISH MEAL: A WARNING TO FARMERS.

MANY agriculturists have of recent years begun to use fish meal as a valuable adjunct to the normal diet of many animals and birds; in the proper proportion, which is a small one, it forms one of the cheapest sources of protein in the ration. About 5 per cent. in the case of chickens, 10 per cent. for pigs, 10 per cent. for ducks, 2 ozs. per 100 lbs. live weight for sheep, 1 part in 7 to calves, 3 lbs. per day to milch cows, 2 lbs. per day to fattening beasts, and 2 lbs. a day to horses are about the proper ration, calculated on the safe side, and provided always that the fish meal is produced from white fish only and has a salt content guaranteed not to exceed 4 per cent. Those who select their fish meal carefully and limit it to 10 per cent. of the total dry food consumed are working on perfectly sound lines and are feeding with a product that has an average albuminoid value of about 55 per cent. On the Continent the advantages of feeding with fish meal have been realised so fully that before the war, out of a total of 40,000 tons manufactured in this country, 30,000 went to Germany. Unfortunately, fish meals are made from oily kinds of fish that impart a strong fishy flavour to the fat of animals feeding upon the meal. Even the best fish meal cannot be trusted not to affect the meat of animals consuming it if it is fed in proportions greater than those given above. Again, certain compound meals contain fish meal, and their users have not, in consequence, known how much fish meal they were feeding to their stock. From one or other of these causes the result has been that when the pig has gone to the butcher or the bacon factory it has been found that the flesh has not only a fishy odour, but a fishy taste, and that the carcase is unsaleable. The feeders have either been using a wrong brand of fish meal, that is to say one made from herrings and other unsuitable material, or they have used the right sort of fish meal in excess, or they have used a proprietary pig meal containing a full proportion of fish meal and have added extraneous fish meal to the ration in ignorance. It must be remembered that once a pig acquires the fishy taint it takes a long time to remove, and if fish meal be misused it goes without saying that butchers and curers will demand a certificate to the effect that the pigs they buy have not been fed with it in any form. Should this happen, a valuable food will be lost to the country, and the loss is quite unnecessary, for it is not the use, but the misuse, of fish meal that must be guarded against. The Ministry's Leaflet (No. 333), of which anybody can obtain a copy free of charge, sets out the position quite clearly, and must serve as a useful guide to those who are in any doubt as to the proper ration. At the same time buyers of compound feeding stuffs containing fish meal, the presence of which is always perceptible, should insist on knowing the percentage and nature of the fish meal that is present in the mixture.—MINISTRY OF AGRICULTURE AND FISHERIES.

Translations.

TREATMENT OF ULCERS OF THE CORNEA.

THE classic treatment in France of Keratitis with desquamation of the corneal epithelium, and especially of infectious Keratitis, consists in the use of an ointment of finely ground yellow precipitate such as :—

Yellow oxide of mercury	1 gramme
Lanoline	4 grammes
Vaseline	16 ,,

or of a collyrium like :—

Nitrate of silver	20 centigrammes
Stovaine or syncaine	40 ,,
Distilled water	40 grammes.

Numerous oculists have recently vaunted the good effects obtained in man by the use of tincture of iodine in the treatment of corneal ulcers. The medication is not irritant if made in the following way :—

The tincture of iodine ought to be fresh (not more than 15 days old), the hydriodic acid being irritant to the cornea. The cornea is anæsthetised by a few drops of a 2 to 4 per cent. cocaine solution and the application is made with the help of a stylet or a wood match stick, on the thin extremity of which one wraps a little well-pressed cotton wool, which is dipped into the tincture of iodine ; care is taken in withdrawing it from the bottle to draw the wool over the neck, so that it does not contain an excess of the tincture. This done, the operator touches the ulcer lightly, which becomes coloured by the instillation, so that its extent is well defined.

M. Van Liut, of Brussels, has obtained some remarkable results in man by the simultaneous use of tincture of iodine and yellow precipitate ointment (Archives of Ophthalmology, June, 1920). At first sight the combined use of these two agents seems to constitute a therapeutic heresy, for one is advised to avoid simultaneous applications of salts of mercury and iodine for fear of formation of iodide of mercury, a very irritant revulsive, and which one abstains even from prescribing in mercurial collyria on subjects submitted to iodide treatment. But it is sufficient in order to render the combination impossible to have a sufficient space of time between the applications of the iodine and the mercury compounds.

This is the technique to follow :—

1st and 2nd day.—Yellow ointment morning and evening.
3rd day.—Tincture of iodine morning ; yellow ointment at night.
4th day.—Yellow ointment morning and night.
5th day.—Tincture iodine morning ; yellow ointment night and carry on in above sequence until cure is complete.

This combined method brings about rapid cicatrisation of the corneal ulcers and even cures those which will not heal when either of the two mentioned agents are used alone.—*Revue Vétérinaire.*

G. M.

A PRACTICAL PROCEEDING TO OBTAIN COMPLETE ANÆSTHESIA OF THE UPPER MOLAR TEETH IN THE HORSE.

By VAN DEN EECKHOUT.

AFTER some general considerations on the advantages of local anæsthesia, which tends to replace general anæsthesia, except in major operations in the abdominal region, the author specially studies the application of this method to extractions of the teeth.

Anæsthesia is obtained by practising the injection of a solution of cocaine adrenalin into the superior dental conduit so as to act on the superior maxillary nerve at the level of its exit from the maxillary branches. According to the anatomical disposition the anæsthetic injected has the effect of anæsthetising the molars, canines, incisors, the sinuses, the upper lip and the nose on the side corresponding to the injection. The solution injected is as follows :—

Hydrochlorate of cocaine	5 grains.
Hydrochlorate of adrenalin (1 in 1000) ..	5 drops.
Distilled water	160 minims.

The injection is practised by means of a syringe provided with an appropriate needle, presenting the conformation of a small trocar with a stylet terminating in a blunt point. It is made into the infra orbital foramen.

This is situated under the sus-maxillo-labial muscle, a little below a horizontal line passing beneath the inferior extremity of the molar apophysis, the head being held in a vertical position. The operation is done on the cast or standing animal. With the finger one locates the infra-orbital foramen by slightly pushing aside the sus-maxillo-labial muscle towards the median line ; the skin is incised with a bistoury, and the needle, armed with its stylet, is introduced into the dental foramen, and made to penetrate as far as possible. The stylet is withdrawn, the syringe is fitted to the needle and an injection of 85 minims of the solution above-named is given ; the needle is withdrawn, care being taken to compress the region for one or two minutes.

Anæsthesia is complete at the end of 10 to 15 minutes. The operation is not followed by any harmful results if the solution injected is perfectly sterile.—*Rev. Gènèrale de Med. Veterinaire.*

G. M.

[In the *American Journal of Veterinary Medicine* for January, 1918, Major Merillat writes :—" To control the pain of extractions . . . . we use a 2 per cent. solution of cocaine hydrochloride, injected with a long hypodermic needle into the region of the maxillary hiatus for maxillary molars, and into the region of the mandibular foramen for mandibular molars." This latter is the most useful for the practitioner, because in perhaps nine cases out of ten it is a lower jaw molar that needs extraction. The subject was referred to in an editorial on pp. 6 and 7 of THE VETERINARY JOURNAL for January, 1920.—SUB-EDITOR.]

THE INTERNAL SECRETION OF THE TESTICLE AND ITS STRUCTURAL AND PSYCHICAL INFLUENCE ON MEN AND ANIMALS.*

FROM much anatomical, histological, clinical and chemical research work, and from experiments made during recent years on the subject of the internal secretion of the testicle, a good deal of light has been thrown on the vast and obscure field of sexual life. One can assert to-day that sexual life, normal as well as perverted (homosexuality), is dependent on the anatomical structure of the testicle. The histological structure controls the various psychological stages in man and animals and decides whether heterosexual or homosexual tendencies will assert themselves. In 1889, Brown-Sequard drew the attention of scientists to the subject of the internal testicular secretion. As the result of injecting himself at the age of 72 years with testicular extract from the dog, Brown-Sequard stated that his physical and intellectual powers were rapidly improved. His sensational publications have been the origin of much work on this subject and have founded the base of "organo-therapy" *i.e.*, if organic troubles can be laid to the account of insufficient secretion of certain glands such as the testicles, ovaries, thymus, suprarenal capsules, pancreas, thyroid bodies, and spleen, organo-therapy has succeeded in disguising temporarily the nervous symptoms which follow the removal or pathological alteration of certain glands, but no preparation has been able to permanently remove the structural psychical symptoms supervening on the non-functioning of these organs. If organo-therapy has not given all the satisfaction claimed for it, the many and varied experiments carried out have not been in vain, for laboratory experience has demonstrated in an unrefutable manner the existence of an internal secretion. This secretion has provided for us the explanation of certain pathological and psychological lesions. The researches of Bouin and d'Ancel, of Tandler and of Gross have shown that the glandular tissue proper of the testicle has nothing whatever to do with this internal secretion, but that the intermediary substance—the "interstitial gland" of Bouin and d'Ancel and the "gland of puberty" of Steinach—between the testicular canals assumes all the responsibility of that secretion. Bouin and d'Ancel ligatured the *vas deferens* and this brought about

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*Translated from the *Recueil de Med. Vet.* by Capt. E. Victor Hobbs, M.R.C.V.S.

the atrophy of the spermato-generative portions of the testicle, whilst leaving intact the interstitial testicular cells. The authors stated that in spite of putting out of action the glandular substance, the secondary sexual characteristics remained active, a fact which proved that the interstitial gland—that is to say, the intermediary cells—is the seat of the internal secretion.

Tandler and Gross obtained the same result by the application of the Rontgen rays to the epithelial cells of the vesiculæ seminales. The "X" Rays brought about "impotentia generandi," by the alteration of the structure of the epithelial cells, but the secondary sexual characteristics disappeared only if the intact intermediary cells are destroyed by castration. Zoth and Pregel state the sub-cutaneous injection of testicular extract revives the "will to work," removes the sensation of fatigue and provokes the feeling of good health. For a long period the power of excitation has been attributed to spermatic crystals, obtained by tritination and desiccation of the spermatic fluid, but a definite proof has not been reported. One has known since time immemorial that castration of man and beast brings about profound organic changes. With the individual castrated before puberty the primary sexual characteristics are never developed. The prostate gland and the vesiculæ seminales atrophy in the castrated man and animal. The corpus cavernosum of the penis and the ischio cavernosus muscle are not developed and the individual resembles a child or a woman. Castration exerts an influence not only on the sexual aspect, but the whole organic system is affected. The beard of the man does not grow, his voice remains juvenile, and he retains a small and infantile larynx. The castrated man has an adipose tendency, his hair grows rapidly and remains "fluffy." Such profound organic changes can only be ascribed to the internal secretion. Foges removed the testicles of young cockerels and then transplanted a piece of testicular tissue in their abdominal cavities. The secondary characteristics such as the comb, showed themselves, proving that the testicles, although not occupying their normal position, can produce these secondary sexual signs. The veterinary surgeon is not concerned with the psychological changes in the gelding, but we know that in the human subject grave troubles follow the operation. The castrated man becomes depressed, haunted with suicidal ideas, without energy and regardless of feminine charms. Hospitals during the war presented a vast field of observation on this subject. Robert Lichtenstern, of Vienna, has sought to dissipate this psychical depression by the transplantation of normal testicles in castrated men. He took as his guide the experimental transplantations carried out by Steinnach, with animals who had shown that the spermatic fluid was secreted by the intermediary substance and not by the testicular canals. Thanks to these transplantations Steinnach succeeded in reviving the sexual ardour in castrated animals, old and young, and by transplanting both testicle and ovary into castrated animals he even produced artificial hermaphrodites manifesting the bodily and mental signs of both sexes. The experiences of Steinnach have been controlled and confirmed by Athias, Brandes, Lipschütz, Goodale and Knüd-Sand.

Lichtenstern, carrying on from the experimental transplantations of Steinnach; had the idea of performing the same operation on castrated men. The operative technique is as follows :—The excision is made in the inguinal region as for hernia, the muscle after being released from the fibrous tunic is lightly scarified for about four centimetres. A portion of testicle cut into two halves is sutured on to the muscle with catgut. A first suture fixed to the fatty tissue exercises a certain pressure upon the testicle with a view to rendering adherence more intimate and permanent. The operation is completed by one suture in the skin. In 14 cases L. obtained a permanent fixture. The material transplanted consisted in three cases of normal testicles, and in 11 cases of well-developed inguinal testicles provided by individuals normal in a sexual sense and whose psychological integrity had been definitely established. The transplantation must take place direct from person to person and the testicle kept at normal temperature. Among the persons operated on L. found a homosexual individual whose testicles had been tuberculous and removed in 1916. This man, aged 30, presented several feminine characteristics. His abnormal sexual ardour had diminished after castration, but had not completely disappeared. L. stated that a portion of testicle the size of a hazel nut, which was found remaining in the scrotum, was the cause of the continued partial homosexuality. The operative success has been surprising. The homosexual tendency has been changed into a heterosexual one, the feminine sexual characteristics have rapidly diminished and four years after the operation the results obtained still remain. On examining the testicles of homosexuals operated on by L., Steinnach stated that their interstitial tissue showed large cells with two centres or kernels, the cells being isolated or confluent, and to which he attributed the feminine properties which are apt to act antagonistically to the male cells. Normal testicles, even in cryptorchids, do not include such cells.

L. is of the opinion that any homosexuality of man and beast must be laid at the door of a hermaphroditic tendency shown by the " gland of puberty," and that the intensity of both physical and psychological phenomena among homosexuals depends on the number of these feministic cells. The experiences of Steinnach and Lichtenstern demonstrate the invigorating power of testicular matter on both body and mind, and the author is of opinion that further researches are indicated in order to ascertain the amount of power conferred on horses by such transplantations; such power as can be demonstrated in working energy and in stimulation during periods of convalescence.—(*Recueil Med. Vet.*) E. V. H.

Personal.

Congratulations to Colonel W. A. Wood, M.R.C.V.S., the Lecturer on Elementary Veterinary Science at the School of Agriculture, Cambridge, on being recently awarded the degree of honorary M.A. of that University. This is the first time that a member of our profession has received this honour.

NOTICES.

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THE

VETERINARY JOURNAL

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OCTOBER, 1921.

Editorials.

OUR PROFESSION.

UNDER the above heading we publish *in extenso* a most interesting paper, read by Dr. David S. White, the President of the American Veterinary Medical Association, before the Wisconsin V.M.A. at their sixth annual meeting early in this year.

It is of particular interest to the members of the British veterinary profession, because it illustrates that our American cousins are passing through a crisis at the present time, and one which they have made themselves for the profession, largely on account of their determination to raise the standard of their matriculation examination and their teaching.

Dr. White goes very thoroughly into his subject, and traces up the progress of veterinary science in America and Canada from the days when it was started by private enterprise and pioneered by such names as Liautard, Andrew Smith and McEachran, until such times as the Universities took it up and veterinary faculties become attached to them.

Then came the question of uniformity of standard and uniformity of lecture courses, and with university matriculation in some schools, but not in others, the mental standard of the student was a very variable one. The private schools, depending as they did upon the subscriptions of their students, were bitterly opposed to a university matriculation standard, but the American Veterinary Medical Association (which has about 5,000 members), the Bureau of Animal Industry (which employs 1,550 veterinarians), and the U.S.A. Army turned the scale by refusing to recognise graduates other than those from a four years' course college.

The result has been that at the present time, out of the fifteen veterinary teaching institutions in the United States, only two of them are private schools ; all the rest are attached to State institutions or universities. The effect has been to encourage better and more capable men to enter the teaching side of the profession and to stimulate research, but the effect on the numbers of students entering has been, in so far as the consideration of numbers only is concerned, disastrous—but in quality the result must be inexpressibly better, and this higher standard is the one our colleagues in authority mean to uphold and maintain.

Dr. White points out that in 1916 there were twenty-three veterinary schools of North America, with a total of 3,160 students. Now (in 1921) there are fifteen teaching schools (thirteen State and two private) and only 908 students. Attention is drawn to the fact that, owing to the paucity of veterinary students, there is likely to be a shortage of veterinary help for stockowners in the future, and it is interesting to note that the ruling body of the profession in America have recently been passing through a similar stage of discussion as have the Council of the Royal College of Veterinary Surgeons in Great Britain, and on both sides of the Atlantic the decision to uphold a university standard of matriculation has, fortunately, prevailed.

In connection with this one cannot emphasise too much the remarks of Dr. White, and we make no apology for printing them in two places in this issue of the JOURNAL. He says : " As a remedy for this condition (he refers to the comparative paucity of students) some have advised that the entrance requirements to the profession be lowered, again throwing open its portals to anyone rejected in medicine, law or dentistry. It is an old saying that ' a silk purse cannot be made out of a sow's ear.' We are already far enough behind the entrance requirements of the other professions. I do not believe that we can make progress by walking backwards. In the final outcome the matter will adjust itself. If for the next few years the number entering the profession is too small to meet the demand, the public will recognise this fact, and again we shall find the halls of our veterinary institutions well filled."

These are exactly our sentiments, and if we are to hold our place amongst the learned professions we must insist upon a matriculation standard at least on an equality with theirs.

The requirements for entrance to a veterinary school on the Continent of Europe have for a long time been of this standard, and it is gratifying to read in another paragraph of Dr. White's paper that there is a notable increase in the number of veterinary students in France, and Germany. At the present moment Alfort has 222, Lyons 154, and Toulouse 167; whilst Berlin has 410, Hanover 575, Dresden 269, Giessen 202, and Munich 543. *To be retrograde in our preliminary education would be a fatal mistake, socially and pecuniarily.* From the former point of view the general public have no idea of the course of study necessitated before the diploma is obtained, and our social status is entirely what the individual member makes it. Were it classed as belonging to the veterinary profession it would start on a very variable plane.

Pecuniarily we suffer, especially when applying for State appointments, whether public health or even in the army service, because our present standard of matriculation cannot be said to be exactly the same as for human medicine. This state of affairs *must* be altered, and when the standard of the human medical student goes up the standard of the veterinary student *must* go up on an exact equality with it. There must be no argument about that, and if the Council are at all on the waver about it the profession must see that their views are taken by vote before any decision is made which involves in the slightest degree a retrograde step. We commend our readers to peruse Dr. White's paper with care, and we are sure that they will do so with interest.

THE VALUE OF CO-OPERATION AND EXCHANGE.

THE day of the "watertight compartment" has gone, and the time has come when a more intimate understanding must come in the methods to be adopted in the fight against disease. Not only is it necessary for the members of any one profession to pull together, but, in order to get the maximum of success, the different scientific professions (and especially those which are so closely allied as those of veterinary and human medicine) must work in unison. Flesh is flesh, and, whether human or animal, it fulfils a similar groundwork upon which the germs of disease work their ravages, and the sooner this is universally recognised the better for the chances of successful treatment. A recent meeting of the South Wales and Mid-West Veterinary Association afforded a striking illustration of the fact.

that both branches of medicine are awaking to the fact that collaboration is helpful. The essayist, Dr. Savage, a medical man, and the Medical Officer of Health for the County of Somersetshire, read a paper on "Bacterial Food Poisons: Where two Professions Meet," and in it he drew attention to the work respectively of the medical man and the veterinarian on the subject of the inspection of the flesh of animals intended or prepared for the food of man, and emphasised that at the present time there was often to be found a kind of "No Man's Land" of considerable importance, but over which neither exercised sufficient or proper supervision.

Throughout his paper Dr. Savage heartily advocated the importance to be gained by working in closer union, and his views were supported in many telling speeches by those who joined in the discussion.

That the subject was a popular one was shown by the enthusiasm which the paper and discussion brought out, and the President and Secretary (Mr. Morgan Scott and Mr. Aveston) are to be congratulated upon the happy thought which brought together such a large gathering and sent everyone home with new ideas to think about, and the opinion that the day had not been wasted.

DISEASES COMMUNICABLE FROM ANIMALS TO MAN.

Numerous diseases are *directly* communicable from animals to man, but in all probability there are quite a large number indirectly transmitted of whose existence we are not yet fully aware.

Veterinary surgeons, to be up to date, must be made aware of these diseases, and on a further page we abstract from the *British Medical Journal* some of the details of interest to us in connection with "Five Cases of Rat-bite Fever," reported by Dr. F. W. Burton-Fanning, M.D., F.R.C.S.

The full report can be read, if desired, in the *British Medical Journal* for June 18, 1921, and we advise our readers to carefully study the extract here published, as, if it does nothing else, it is a further warning of the potential damage which can be done by that most prolific and obnoxious of all vermin—the rat; and it sets one thinking as to whether some of the obscure cases we meet with in sick animals may not proceed from this cause.

A Society* exists for his repression and destruction, and it behoves everyone to assist by every means within their power in the efforts being made to get rid of these pests. Not only can rat-bite fever be transmitted to man direct from the rat, but, as is shown in the clinical history of Dr. Burton-Fanning's cases, it can be transmitted to man by a kitten, ferret, or some other species of animal who happens to have become infected from a diseased rat.

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* The Vermin Repression Society, 44, Bedford Row, W.C.

"GRASS" OR "BORNA" DISEASE.

On a further page we publish a very interesting clinical article by Mr. W. T. Hewetson on the above-named disease which has recently been brought into prominence by the investigations of Professor Gaiger, of the Glasgow Veterinary College, and his enthusiastic assistant and fellow worker Capt. Dalling. If subsequent experience confirms the researches of these gentlemen in their statement that the so-called "Grass Disease" and "Borna Disease" are one and the same thing, then a great step will have been made in veterinary pathological science, and all credit must be given to those to whose originality and painstaking research the credit is due. Then will come the turn of the clinician to do his part and essay a treatment which will effect a cure, for, after all, it is in clinical work that "the greatest good is done for the greatest number," and the laboratory research worker depends upon the clinician to work out and test his theories. Mr. Hewetson has had many years experience of this disease, and in giving the result of this to the profession has indeed pioneered the way and added something worth adding to the structural edifice of veterinary pathological science. It now remains for other practitioners to do their part either by relating their own efforts in the treatment of this fatal disease or by following up the hints given by the pioneers of the subject and recording in their turn the results for the benefit of their fellow-practitioners.

R.A.V.C. OLD COMRADES' ASSOCIATION DINNER.

It has now been decided to hold the first annual dinner (which was postponed in June last owing to the difficulties of railway travelling, to London) on Monday, November 7, at the Holborn Restaurant, 6.30 p.m., the President, Major-General Sir Layton Blenkinsop, K.C.B., D.S.O., in the chair. Tickets, price 7s. 6d. each, can be obtained from the Secretary, R.S.-M. Corr, R.A.V.C. Records Office, Woolwich Common, London, S.E.

More than 100 members have already taken tickets, and the gathering looks like being a representative one. Morning dress will be worn.

General Articles.

OUR PROFESSION.*

By DAVID S. WHITE,
President, American Veterinary Medical Association,
Columbus, Ohio.

WHAT I wish to say to you to-day is in appreciation of the profession which you gentlemen have adopted as your own. I sometimes feel that too few veterinarians are proud enough of their profession. I think, perhaps, there is too much humility and too little pride. This feeling of humility is the child of ignorance and not of knowledge. No profession in this country has developed without a struggle. Whether it be law, medicine or theology, its place in civilisation must be made through a long chain of deeds performed which are helpful to the civilisation in which it exists. Unlike the other professions, that of veterinary medicine was taken up in this country only within comparatively recent years. When our forefathers came across the seas and settled in New England they found a rugged country covered with a dense growth of forest. Out of the forest they were compelled to hew homes and farms in order that they might live. Land in those days might be had for the asking. The livestock interests were obviously nil. The few cattle, sheep and swine they possessed were branded and turned loose in the woods where they multiplied much as in the natural state. Obviously under these conditions there was no particular need for veterinary service. In fact, in those days an able-bodied man who was neither a hewer of wood nor a drawer of water was more of a liability than an asset to the community. It was not until the post-stump stage of pioneer civilisation that our ancestors felt rich enough to afford in a community an individual who did not toil with his hands as they. Feeling the need of the spiritual first a demand arose for ministers of the gospel; later for lawyers for the settlement of disputes, and then for trained physicians who could administer to them in sickness and in injury. It was not until the Indians had been driven back to the far west, towns and villages built and farm lands fenced, which caused the animal owners to keep their stock at home, that any demand arose for specially trained individuals to administer to the ills of animals as the physician did to man. In those early days, as the need developed, there arose in each community a self-appointed animal doctor. He was usually a man of no education, of little knowledge of veterinary art, and seldom equipped with more than a garrulous tongue and a keen desire to escape the drudgery of hard hand toil. Following in his wake there came out from the old countries a few men trained in foreign veterinary schools who usually settled in the larger towns soon to enjoy lucrative horse practices. A few of these men, realising that as the country grew in livestock population a demand for veterinary service would grow with it, turned their attention to the training of men to become veterinary doctors. While the earlier attempts were largely failures, a few of them did possess sufficient business acumen to create successful veterinary schools. Most notable of these pioneers were the late Andrew Smith of Toronto, Duncan McEachran of Montreal, and Professor Liautard of New York. Each of these men founded a school. Obviously at this time the curriculum was brief and the entrance requirements the ability to pay the necessary fees. Later one of the great universities of the United States was prevailed upon by Huidekoper of Philadelphia to establish a veterinary department at the University of Pennsylvania. In the meantime some of the land grant colleges, which had been teaching veterinary subjects to agricultural students, branched out in courses leading to veterinary degrees. Most notable of these were Cornell University, the Iowa State Agricultural College and the Ohio State University.

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* A paper read before the Sixth Annual Meeting of the Wisconsin Veterinary Medical Association, held at Madison, Wisconsin, U.S.A., January 18, 1921.

Following the pattern set by Smith, Liautard and McEachran, such men as Hughes, McKillip, both of Chicago, Gill of New York, Stewart of Kansas City, and others, each organised, in conjunction with their respective practices, veterinary schools. As the number of students attending these schools was large, the course of study confined largely to lectures given by resident practitioners and often with little or no compensation and no expensive laboratories to maintain, the experiment of educating veterinarians became a remunerative one. This led to the establishment of still more private schools until in 1916 ten of them existed in the country. Concerning the private schools much debate has always existed. Some members of the profession have been openly critical regarding their existence. However, this much must be said : They did supply the country with a great many good men as among the hordes of students who attended them existed some excellent material. These men made good in the veterinary field, and largely through their efforts veterinary medicine in this country stands where it does to-day.

The state schools, generally speaking, began their work in the most primitive way. Usually an ambitious veterinarian, occupying the chair of veterinary medicine in a land grant college, where he gave instruction to agricultural students, inaugurated a veterinary curriculum leading to a degree. While on paper the course of study looked alluring, in practice the teaching staff was hopelessly undermanned and the buildings and facilities for instruction wholly inadequate. In the beginning few students were attracted to these schools. The support of the school came through legislative appropriations, usually given as a lump sum to the land grant colleges as a whole. The money was distributed by the authorities usually on the basis of the "greatest good to the greatest number." As the number of veterinary students was small it received but a scant share of the appropriations. Furthermore, "veterinary science" was looked upon not as a course of study embodying a large number of basic-scientific and professional courses, but as a single subject, like physics or chemistry. This assumption on the part of the authorities naturally held back the development of the veterinary department. It was not until the reorganisation of the Bureau of Animal Industry, which created a sudden demand for a large number of veterinarians for food inspection and animal disease control, and the division of the western prairie ranches into small farms, creating a demand for veterinary service, that large numbers of young men entered the profession. This led to an overcrowding of many of the state-supported veterinary departments. The increase in student numbers had its influence when it came to a division of the appropriations. More men were added to the teaching staffs, buildings were erected, facilities and equipment greatly increased. With the increase in student numbers, and the association with teachers and students in the non-veterinary departments of the land grant college, an influence was exerted to require higher entrance requirements in keeping with those demanded of students entering agriculture, engineering and other courses. This was done in order to procure a better type of students from the standpoint of general education. The impetus given increased entrance requirements originated in the state veterinary schools. Later one of the states by law required that all students entering veterinary schools in that state should be graduates of a high school or its academic equivalent. Obviously private schools were somewhat hostile to this proposition. They depended for their existence entirely upon student fees. To reduce the number of students, which higher entrance requirements would produce, was inimical to their interests.

Following the lead of the American Medical Association, the American Veterinary Medical Association, after a canvass of the situation, lent its influence to higher entrance requirements. This was followed by the Bureau of Animal Industry and by a few of the state examining boards. One result of requiring higher general education of the veterinary matriculant has been to reduce greatly student numbers, especially in the more poorly equipped schools. Generally speaking, the better educated the matriculant, the more discerning and demanding he is in regard to teachers, facilities and equipment.

To-day all of the veterinary schools of the United States and Canada require a minimum of four years of high school training, or its academic equivalent, and beginning January, 1921, the same preliminary education is required of veterinarians who enter the service of the Bureau of Animal Industry. I do not mean to state that the reduction in the number of veterinary students in North America is entirely due to increased entrance requirements. There are other factors which undoubtedly bear upon this matter, but in our opinion the principal one is the higher educational qualification demanded of the matriculant at the present time.

The veterinary profession of the United States, despite its youth and its origin from an educational standpoint, has made a record to be proud of. No country in the world can boast of a mechanism so well organised and equipped to combat disease outbreaks as is afforded by our National Bureau of Animal Industry. This Bureau has in its employ 4,673 persons, of whom 1,550 are veterinarians. While busy with hog-cholera control in 34 states, tuberculosis eradication in 43 states, tick eradication in 10 states, scabies, anthrax, dourine and stockyard inspection in 36 states, virus-serum control in 12 states, quarantine inspection in 9 states, and meat inspection in 46 states, it has found time to organise a plan of preparedness so well conceived that any invasion of any foreign communicable disease of animals may be combated with great assurance of success. Nowhere in the world have the veterinarians, under their own control, as large, inclusive and efficient an organisation as our Bureau of Animal Industry. In my travels in other lands I noted the envy in which this organisation was held by my foreign colleagues.

In most of the states there now exist fairly adequate systems of veterinary police. Unfortunately the efficiency of many of these organisations is subject to political interference. The appointment of a state veterinarian, for instance, by the governor is unfortunate. His office should be one of continuous administration. Changing each two years the policy of the state veterinarian's office and the displacement of many of the technical employees of this office do not augur for the best interests of either the veterinary profession or the people of the state concerned.

A decided change for the better has occurred in the Veterinary Service of the United States Army since the close of the war. The National Defence Act of 1916, while it gave to the veterinarian the rank of a commissioned officer, was so loosely drawn, in so far as it applied to the veterinary service, that the status of the veterinarian was susceptible to more than one interpretation. It furthermore created no organisation of the veterinary service, and tended to crush, rather than promote, administrative ability in veterinary officers. The result was that when the United States entered the Great War an entirely new, and for our people untried, system had to be inaugurated. In place of a small, well organised and equipped veterinary corps, which could form the nucleus of a larger organisation in case of war, there existed only a handful of unorganised regimental officers just commissioned, though many of them had seen years of service, who could not take the initiative required to create an efficient veterinary service for an army of four millions of men. This led to civilians of administrative experience being in many instances placed over the regular. That resentment should result from this unbusinesslike but necessary procedure is obvious. Largely through the influence of our National Association, Congress was prevailed upon to give the veterinarian a definite status in the army and to accord him more adequate rank. While the Army Reorganisation Bill of 1919 falls far short of granting to the veterinarian full authority to do his own job, it is nevertheless a great step in advance and one which may from time to time be amended by subsequent legislation.

In addition to the veterinary schools and police organisations there have grown up in this country a large number of veterinary associations designed to uplift the profession. Most of these organisations are alive and progressive. A new profession, as is ours, is not afflicted with traditions which tend to hold it back. Therefore, once an association begins showing signs of disease it is not long before its requiem is being sung. Our National Association, which now numbers approximately 5,000 members, is numerically the largest organisation of its kind in the world. Its influence upon veterinary education has already been felt. Its policies and politics, however, have not yet fully been determined. Like many organisations of its type, it has been somewhat self-engrossed and more interested in its internal affairs and politics than it has in the good its organised effort could bring to the profession at large and to the public. However, it has outgrown its swaddling clothes, has thrown away its stick of candy, and is rapidly developing into a red-blooded manhood, whose influence upon the profession and the public will be felt. As a matter of detail may be mentioned the desire of this Association to procure for itself a permanent home from which its business may be transacted and in which its records may be securely housed, and a permanent secretary whose sole business shall be the administration of its business. It takes time and brains to perfect an organisation which is to be efficient. Like the farmer, the veterinarian has been difficult to organise. The majority of the rank and file are busy practitioners, each a little king in his own realm. He feels his independence, perhaps, too keenly, is too often self-satisfied, and fails to recognise that sometimes by surrendering a part of his time, money and brain-power he can develop something which will later pay to him handsome returns on his investment.

I presume many of you here to-night have been thinking about the future of the veterinary profession. Since the advent of the automotive vehicle a good deal of alarm has been created in the ranks of the profession. Some of us have hypnotised ourselves into believing that the profession is now a derelict, a mere wreck on the beach. Admittedly the automotive vehicle has led to a reduction in the number and a change in the distribution of horses and mules. This has been felt particularly in the large cities. Veterinarians who formerly enjoyed lucrative horse practices have found themselves bereft of an income derived almost entirely from the horse. While some of the more discerning ones were awake to the situation early enough to adapt themselves to the change, not a few surrendered to what seemed the inevitable and left the profession for other fields. On the other hand, small animal practice in the cities has tremendously increased in the past 20 years. While 25 years ago one cage in the small animal ward of the Ohio State University was ample to encoffin the occasional canine or feline patient, to-day we find 125 cages insufficient. Furthermore, the value of the average small animal patient is a sentimental one, thus placing it in a category more nearly approaching that of the human patient.

Since 1867 in the rural sections milch cows have increased from 8,394,000 at $29 each to 23,467,000 at $79 each in 1919. Other cattle increased in the same period from 11,713,000 at $16 each to 44,399,000 at $45 each. Sheep from 39,385,000 at $2·50 per head to 49,863,000 at $12 per head. Swine from 24,694,000 at $4 per head to 75,587,000 at $22 per head. These statistics show that all kinds of livestock have increased greatly in numbers and value since the Civil War, keeping pace with the increase in population. The only exception is the horse, which has actually decreased in numbers and fallen off in price. In 1867 there were 5,401,000 valued at $59 per head, and 822,000 mules at $67 per head. Personally I do not believe any of us will see the time when, as predicted by some, the horse will become as great a curiosity as the giraffe or other rare circus animal. For the horse of proper type of the heavier breeds there is an excellent future. To-day for each colt born in the United States three adult horses are taken from the supply and put to work. In the last decade no marked improvement has been made in the automotive vehicle. The Ford of 1910 in motor and chassis design is very much like its 1920 descendants. No radical departure from this design seems contemplated. Farmers are finding the tractor a valuable supplement to the horse on farms adapted to its use. On the other hand it has been found that even where the tractor can be used economically from other standpoints it rarely displaces enough horses to "pay for its keep."

Admitting that the veterinary profession is now in a transitional stage, endeavouring to adjust itself to new conditions made complex by the fact that we are in the wake of a great war, when we realise what the profession has done for the people of the country in the past we must assume that its task is by no means finished, and that we really stand on the brink of still greater opportunities. The livestock industry of the United States represents an investment of approximately 10 billion of dollars. Annually three hundred millions of dollars are lost to this industry through animal disease. As the population increases the problem of feeding the masses grows ever greater. To meet this problem a more intensified type of agriculture must be undertaken. While in the early days thousands upon thousands of cattle roamed the unfenced ranges of the West the cost of producing beef was a minimum one, with the fencing of the open ranges and their division into smaller farms, coupled with the introduction of irrigation, land values have so greatly increased that the old method of raising cattle has been abandoned. The production of beef on high-priced land is a much more expensive proposition which adds greatly to the value of each animal produced. What applies to cattle applies equally well to horses, sheep, swine and poultry. In the future we may look for a greater production of better bred animals and higher priced ones, for under a system of intensive agriculture only those animals will be retained which pay for their keep. The veterinarian of the future, in my opinion, will find veterinary practice, which now includes all domesticated animals, even poultry, more stable in its remuneration than ever before. In this connection, and as evidence that this view is not shared by the masses, permit me to draw your attention to the student population of the veterinary schools of North America.

The tabulation shows 908 students matriculated in the fall of 1920 in the fifteen veterinary schools which include two private institutions, one of which is no longer accredited by the A.V.M.A. Of these 185 were freshmen. In the then existing twenty-three veterinary schools in North America in 1916 there were 3,160 students.

While, as noted, the higher entrance requirements are probably the principal factor in producing this marked decline in attendance, undoubtedly there are other factors. Briefly some of them are the complaints of once prosperous veterinarians who have lost their city

STATE VETERINARY COLLEGES 1920-1921.

Name of Institution.	First Year.	Second Year.	Third Year.	Fourth Year.	Special.	Totals.
Alabama Polytechnic Institute	20	15	12	6	...	53
Colorado Agricultural College	26	22	20	20	...	88
Georgia State Agricultural College ...	7	7	3	4	...	21
Iowa State Agricultural College ...	30	24	18	22	...	94
Kansas State Agricultural College ...	9	20	13	18	1	61
Michigan Agricultural College	1	8	4	8	...	21
New York State Veterinary Coll. (Cornell)	13	32	15	16	2	78
New York State Veterinary College (N.Y. University) ...	7	3	5	8	...	23
Ohio State University	19	30	30	25	...	104
Ontario Vet. College (Toronto, Canada)...	24	32	22	17	...	95
University of Pennsylvania	4	8	7	11	...	30
Texas Agricultural and Mechanical Coll.	1	5	2	6	4	18
State College of Washington	3	1	6	12	...	22

PRIVATE VETERINARY COLLEGES 1920-1921.

Indiana Veterinary College	11	28	23	73	1	136
St. Joseph Veterinary College	10	38	16	37	...	100

horse practices; the low salaries paid the veterinarians in the Bureau of Animal Industry; the poverty of many municipalities which have outgrown their ability to raise enough taxes to support themselves adequately; the swollen wages of to-day, and the popular belief that since the production of automotive vehicles there is no further need for the veterinarian. As a remedy for this condition some have advised that the entrance requirements to the profession be lowered, again throwing open its portals to anyone rejected by medicine, law or dentistry. It is an old saying that "a silk purse cannot be made out of a sow's ear." We are already far enough behind the entrance requirements of the other professions. I do not believe that we can make progress by walking backwards. In the final outcome the matter will adjust itself. If for the next few years the number entering the profession is too small to meet the demand, the public will recognise this fact and again we will find the halls of our veterinary institutions of learning filled. There has been notable increase in the number of veterinary students in France and Germany. The figures are: Alfort 222, Lyons 154, and Toulouse 167; Berlin 410, Hanover 575, Dresden 269, Giessen 202, Munich 243. The requirements for admission to a veterinary school on the Continent are practically equivalent to two years of arts college work in this country.

We believe a partial solution of the problem is to strengthen our schools by greater appropriations to procure better teachers, more adequate facilities and equipment. The livestock owners of the United States will demand that some group of men administer to the sick and injured animals which they possess and advise them against anything which is a menace to these animals in health. If the veterinary profession is not competent to do the job some other group of persons will and must. But I do not believe that, as a profession, we are willing to quit the job. Our past achievements are known to the wide awake livestockman. He is our best friend and counsellor. When we think of the great animal plagues which our profession has either kept out of the country or controlled or eradicated, once they got in, we have much to be proud of. The rinderpest has never visited us. Sheep pox has never existed among us. Surra has been kept out. Despite its remarkable versatility in its effort to gain a foothold on the American Continent that dreaded immigrant foot-and-mouth disease has each time been accorded such an inhospitable reception that its future under the American flag seems very dark. Those of you who remember the last epizoötic of this plague know well the trials and tribulations of our profession in its effort to perform its duty. With Congress, state legislatures, governors, and influential citizens, some of them members of our own profession, on our backs, in the language of football, the veterinary line held. While for a time they were on our two yard line and bucking hard, nevertheless we held for "downs," the ball was passed over, and we punted out of danger. With the disease in twenty-two states, covering an enormous territory greater than that of all Europe and Great Britain combined, the veterinary profession forced the plague to evacuate our shores. With southern cattle fever, despite much opposition, the veterinary profession continues to crowd southward, the quarantine line extending from the Atlantic to the Pacific. It needs no great stretch of imagination to see the last of the cattle ticks drowned in the Gulf of Mexico. After much misrepresentation, the use of tuberculin as the most important factor in the eradication of tuberculosis of cattle has been generally accepted by the public. The great white plague is gradually receding, and while in our time it may never be entirely wiped out, we may look forward with confidence to a system of control which will cause it to become negligible. Hog-cholera we now know how to control. Through the discriminating and skilful use of serum-virus on healthy herds hog-cholera has ceased to be a problem from a veterinary standpoint. Once the public is educated to the point of co-operation this disease will join the "used-to-have-its." With glanders, rabies, dourine and the various skin diseases caused by mites, veterinary control is becoming yearly more manifest. The most serious problem, and the one against which we have made the least progress, is the abortion disease of cattle. But of this we do not despair. Our history shows that we have in time licked every plague which confronted us. We are of the firm belief that history will repeat itself in this regard. All our profession needs to-day is to await the development of more men of the best type. Some of these are already decorated with a veterinary degree, but still young, and awaiting the golden opportunity to make a place for themselves in the profession. Some are in the schools; others will enter the profession once they realise its importance to the nation and the service which they, through it, can render to mankind. No veterinarian, who has knowledge of the accomplishments of his profession, need feel the sting of humiliation. Rather should he feel the inspiration of a pride, the product of a devotion to a duty well performed. Whether it be in the field of practice, in national, state or municipal veterinary police work, in research, in teaching or in the army, experience has taught us that once given the authority to do his own job the veterinarian has always made good.

It should be part of the business of every veterinarian to create about him an atmosphere of optimism concerning his profession. He should affiliate himself with local, state and national associations, and do so with more of the spirit of what he can put into these things than what he can get out of them. Shortsightedness has brought too many of us to professional ruin. Farsightedness is the keynote of professional success. Let us as a profession present a united front. Let the slogan be less knocking, more boosting. Numerically we are the smallest of the learned professions. We cannot, therefore, afford to allow our house to become divided against itself. Our greatest asset is our knowledge of things of which other men know little or nothing. Without bombast or brag let the people know what our mission is and that we are prepared to carry it into effect. In biblical language "let your light so shine before men that they may see your good works." —*Proceedings of the Wisconsin Veterinary Medical Association.*

FIVE CASES OF RAT-BITE FEVER.*

TWO CASES TREATED SUCCESSFULLY BY NOVARSENOBILLON.

BY F. W. BURTON-FANNING, M.D.CAMB., F.R.C.P.,
Honorary Physician to the Norfolk and Norwich Hospital.

JUDGING from my experience, I am inclined to think that this remarkable disease is not so rare as is generally supposed. It has been well recognised in Japan since 1899, and some 40 cases have been recorded there. But it was not until 1910 that Sir T. J. Horder* published an account of three cases of rat-bite fever, stating that they were "instances of a disease hitherto undescribed, at least in this country." Since then single cases have been recorded by Dr. G. S. Middleton,† by Dr. R. W. Cruickshank,‡ by Dr. J. O'Carroll,‖ by Professor R. Tanner Hewlett and Dr. G. H. Rodman,§ by Dr. F. Nicholson,** and by Dr. J. H. Nixon.†† Dr. A. G. Atkinson‡‡ had one case under his own observation, and collected the particulars of five other cases, which he published for the first time, together with an excellent account of what is known about this disease.

Since 1897 I have seen five patients suffering from rat-bite fever, all of whom came from different parts of Norfolk. In addition, I have been told of a few other cases, some of which at least were probably instances of the same disease.

The mortality of rat-bite fever in Japan is stated to be 10 per cent.

The fifteen published cases in Great Britain and my own five cases all eventually recovered. It has been noted as one of the features of the malady, as seen in this country, that there is tendency to its spontaneous subsidence, but its course may be a very long one and the patients are usually gravely ill. In different cases the duration has varied between a few months and as many years. Until recently it was agreed that no treatment was of any avail. The periodic attacks of fever have led to the trial of large doses of quinine, but this and a number of other drugs—including atoxyl—have been found useless. Now, however, we have information on the organism which causes the disease, and the last two patients had the benefit of a rational method of treatment which promises to be a cure.

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* Abstract of an article in the *British Medical Journal*, June 18, 1921.

* *Quarterly Journal of Medicine*, 1910.

† *Lancet*, 1910.

‡ *British Medical Journal*, 1912.

‖ *Dublin Journal of Medical Science*, 1912.

§ *Practitioner*, 1913.

** *Practitioner*, 1913.

†† *British Medical Journal*, 1914.

‡‡ *Medical Chronicle*, 1913.

Many different micro-organisms had been found in the past by some observers, and their presence refuted by others. Horder's cases were thoroughly investigated, but with negative results. From two of my patients the blood, and fluid from puncture of inflamed skin in one, have been examined by Dr. G. P. C. Claridge, but he found no organism, and there was no growth on culture media. Other observers have also agreed that there was nothing to be found in the blood or elsewhere.

I am indebted to Dr. Atkinson for having my attention called to a publication by Mr. A. G. R. Foulerton,* describing *Spirochaeta morsus muris*. This organism has been found by Japanese investigators "in the blood of one out of forty-three apparently healthy house rats examined. Inoculation of a white mouse with the blood of this rat was followed by an infection identical with that produced by inoculation with material from human cases." The negative results obtained by ordinary examination and by culture of the patients' blood are explained, for the demonstration of the spirochaete by direct examination is stated to be difficult. But if white mice are inoculated with the blood, or with exudation from the skin, or with liquid from the affected glands of a human patient suffering from rat-bite fever, the spirochaete can be demonstrated in the mouse's blood. Mr. Foulerton kindly undertook to make some inoculation experiments with the blood of Case III. Six guinea-pigs were inoculated with blood drawn during two bouts of fever, four of the animals have remained quite well, and in none of them have any spirochaetes been detected. Mr. Foulerton writes: "But the clinical evidence leaves no doubt whatever as to the nature of the case, and it appears that others have found the experimental confirmation, by inoculation with patient's blood, somewhat uncertain of result."

Before this spirochaete had been identified as the cause of rat-bite fever its treatment with salvarsan had been advocated by S. Hata.† He used salvarsan in eight cases. Five were immediately cured, a sixth case was benefited, and the remaining two cases improved temporarily, but relapsed later. In regard, however, to these last two cases, the author explains that they did not receive a large enough dose. In Case I of mine an intravenous injection of novarsenobillon 0·45 gram was given by Dr. Claridge. As will be seen from the chart an immediate effect was produced, and for the next five weeks the patient had no recurrence of the febrile attacks. Moreover, all the local inflammatory manifestations at once began to clear up, and his general condition to improve markedly. So he returned home to complete his convalescence. Five weeks later it appeared, however, that he was not quite cured. There occurred a rise of temperature to 101·4° and a transient erythema on the limbs. Dr. G. C. Gaynor, under whose care he was at home, gave him a second intravenous injection of novarsenobillon 0·6 gram, and the temperature remained normal for the next seven weeks, while he continued to regain weight and strength and was able to resume work. Two more similar doses were given at intervals of two and three weeks, as the temperature again rose on single occasions to 100°, with reappearance of the rash. Three months after his first dose, which was followed by subsequent injections at irregular intervals, the patient appears finally cured and has regained twenty-two pounds of weight.

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* *Journal Pathology and Bacteriology*, 1919.

† Epitome, *British Medical Journal*, 1912.

In Case III the first injection of novarsenobillon was followed by a similar abrupt cessation of fever. Three more doses were given at regular intervals of a week, but from the time of the first injection he made an uninterrupted recovery as regards every feature of his illness.

If a conclusion may be come to from the experience of these two cases, I would say that a single dose of novarsenobillon puts a stop to the recurring attacks of high fever, and reduces all the inflammatory affections of lymphatics and skin. But, as in the case of *Spirochaeta pallida*, the injection must be repeated at regular intervals of a week to complete the cure.

I will give briefly the notes of three of the patients :—

CASE I.

I. H. B., aged 54, was admitted into the Norfolk and Norwich Hospital, under my colleague Dr. A. J. Cleveland, who was kind enough to transfer him to me for the purpose of this communication. He had never been ill previously. On October 3, 1920, while rat-catching, he was bitten on the left index finger by a ferret which had killed and partly eaten several rats. There were four small punctures on the finger which quickly healed, and never showed at all after the first few days. On October 15 he began to feel ill, and the left axillary glands enlarged. A few days later he was seen by Dr. Gaynor, who noted lymphangitis and lymphadenitis of the left arm, with areas of inflamed skin in other parts, and attacks of fever every few days.

On October 25, on admission to hospital, the patient was obviously very ill; he had a muddy complexion, and was heavy and prostrate. On examination the striking feature was lymphangitis. This could not be traced directly from the bitten finger, but was most marked over both shoulders. Coursing from the tops of each shoulder, over their anterior aspects to the axillae, were three or four parallel red lines. These could be seen and felt to be of about the thickness of the stem of a clinical thermometer. The glands in the right axilla were less enlarged than those in the left axilla, but the lymphangitis was equally marked on the two sides, and less obtrusive affection of the vessels was seen in both arms. Another phenomenon was the occurrence of circular patches of erythema on the forehead, the face, the chest, the upper abdomen, and the forearms. The larger of these were about an inch in diameter; they were red in colour, with a yellowish inner ring. Some were so prominent and swollen as to suggest the presence of pus. With each febrile attack these inflammatory affections of the lymphatics and of the skin would become aggravated and fresh lesions would appear. My patient had a little diarrhœa for a few days, and during each attack of fever he complained also of much soreness and dryness of the throat, where some congestion was apparent.

For the first three weeks of the illness he had epididymitis of moderate degree on the left side, which gave him some pain during its existence, but which subsided readily while the other symptoms were at their height. This is a complication which I have not found recorded by others, but it is interesting to read in Foulerton's paper that on post-mortem examination of a patient in Japan there was found a single spirochaete in the testicle, while numbers were found in the kidneys and suprarenal glands.

CASE II.

W. A., aged 49, was admitted under my care into the Norfolk and Norwich Hospital on December 11, 1897. He had always lived in Acle, which stands in the centre of a district known for its rivers, broads and marshes, and where *Anopheles maculipennis* is still constantly found. At the age of 10 he had ague, but no mention is made in the notes of recurrence. Nine weeks before coming under my care he had been bitten by a rat in the palm below the right wrist. A local abscess formed, and there was lymphangitis up the arm. An incision had been made, but the skin remained red and indurated. Lymphangitis of the right arm and forearm was the conspicuous condition, but he also had patches of erythema on the other arm. He had paroxysms of fever, shivering and sweating at intervals of from two to four days, along with which it is recorded that the inflammation in the arms increased. Dyspeptic symptoms with frequent vomiting occurred during the whole illness. It was particularly recorded in the notes that quinine in doses up to twenty grains failed to avert the attacks of fever, the last of which occurred fifteen weeks after the bite. Many examinations of his blood were made by Dr. S. H. Long, who at length found a few malarial plasmodia. This finding was confirmed by Professor Nuttall, who saw the slide, which is still in Dr. Long's possession.

CASE III.

S. H., aged 38, admitted into the Norfolk and Norwich Hospital on March 14, 1921, was bitten by a rat on February 15, and the small wound on the right thumb healed rapidly under local treatment. About twelve days later there were pain and tenderness at the site of the bite, which increased during the next few days and then extended up the forearm to the axilla. On March 3 the thumb was incised by his doctor, but no pus was found. Headache, sleeplessness, and slight sore throat, with increasing feverishness, were complained of, and he was sent to the hospital. There he presented the aspect of acute illness, with flushed face and injected conjunctivae. The surface of the body, of the face, and of the limbs was covered with an extensive papular rash. This was darkish red in colour and with each attack of fever the papules enlarged and fresh ones appeared. The spleen was just palpable and remained slightly enlarged during the illness. On the palmar surface of the right thumb was a sore as large as a florin; this was covered by a yellow slough and surrounded by red skin. There was marked lymphangitis from the thumb up the forearm and the axillary glands on the right side were enlarged and painful.

A blood count showed 11,100 white cells and no eosinophilia. The attacks of fever are represented in the accompanying chart. As these came on the patient complained of severe headache, he felt cold, then followed profuse sweating and occasional vomiting. On one night he was delirious with the fever.

Without recounting my cases at greater length, I would say that the points of rat-bite fever are as follows:—The illness is caused by the bite of a rat, or, as in one of my cases and in one of Atkinson's, by the bite of a ferret, or, as in another of his, by the bite of a kitten—all these animals having just bitten the body of a rat.

Rat-bite fever is a serious illness, as testified to by a medical man who himself suffered from it in 1896. He was seen by several eminent doctors, and thought then to have some form of blood-poisoning. Dr. G. Master's case is now included in Dr. Atkinson's account of rat-bite fever, and he writes to me:—

"I was away from work for seven months and did not feel fit for eighteen months after the start of my illness. The wasting was extreme; I could make my two hands meet round my waist, and at one time I could not turn myself in bed. Treatment did not seem to help in any way."

It now appears that rat-bite fever can be added to the list of diseases for which the cause and the efficient remedy have been found.

Clinical.

EVERSION OF THE BLADDER IN THE MARE DURING PARTURITION.

By R. HUDSON, F.R.C.V.S.
Retford.

Two cases of this rare condition have occurred in my practice this summer on adjoining farms, and at about the same time.

In the first case the mare—a six-year-old Shire—was prepared for foaling. She was found " in pains," and soon put out what the owner and foreman thought to be the " fleb." Following the usual custom the foreman made an incision seven or eight inches long, but no waters escaped, and as they could see something inside I was called in. On arrival I found the mare lying down, quiet, and only straining slightly at long intervals. Hanging from the vagina was a spherical mass, tense as a blown-up football, which was easily recognised as the urinary bladder. Through the incision made by the foreman I could see that it was packed full with small intestine, held from escaping by shreds of bladder wall which had not been cut. The whole mass was soiled with fæces and bedding, some of which lay among the intestines. The foal was found to be dead, and, the case being regarded as hopeless, I had the mare destroyed.

The second case also occurred in a Shire mare. She had commenced to foal, but the act was delayed owing to the foal's fore-legs being flexed at the knees and below the pelvis. The urinary bladder was completely everted, but did not contain any intestine, and was not so tense as in the other mare. The mare was in great distress, being bathed in perspiration, walking round the box and throwing herself down, straining when both up and down with great violence. A twitch was applied, the everted bladder washed, dressed freely with lard, and replaced without much difficulty by working from the neck to the fundus. Fearing eversion, pressure was applied to the neck of the bladder with one hand and an attempt made to raise the forelegs with the other, but the mare strained so violently that the bladder was again forced out, and also the rectum for about four inches.

Pains came on with such violence and rapidity that the mare was difficult to restrain, and it was evident that she would injure herself if she could not be narcotised quickly. Fortunately I had taken the chloroform muzzle with me. It was put on, the mare being held to the manger ring by a rope run through without tying. Three ounces of chloroform were put in, and in a few minutes the mare began to reel about and went down. Replacement of the bladder was again attempted, and although more difficulty was experienced than in the first instance, it was eventually replaced, the foal's legs straightened, and the foal delivered. During the operation a few pains were felt, but they were too feeble to interfere with the replacement of the bladder or the raising of the legs. When the foal was delivered the mare looked like collapsing, her breathing becoming very shallow, but the muzzle having been removed during the act of withdrawing the foal, her tongue was pulled out to enable her to breathe more freely, and after rather an anxious time her respirations became more normal. The mare was given a mild dose of physic and salines, no treatment of the bladder being attempted. On the following day she was well rugged and placed out in a paddock, being brought in at night. She made a good recovery. Her urine was muddy for about ten days after.

These two cases, although showing the same condition, were very unlike in the way they behaved. Had it not been for the injury to the bladder and the presence of intestines in its interior, the first case would have been an easy subject for treatment, but the second, I feel sure, would have been hopeless without the help of chloroform.

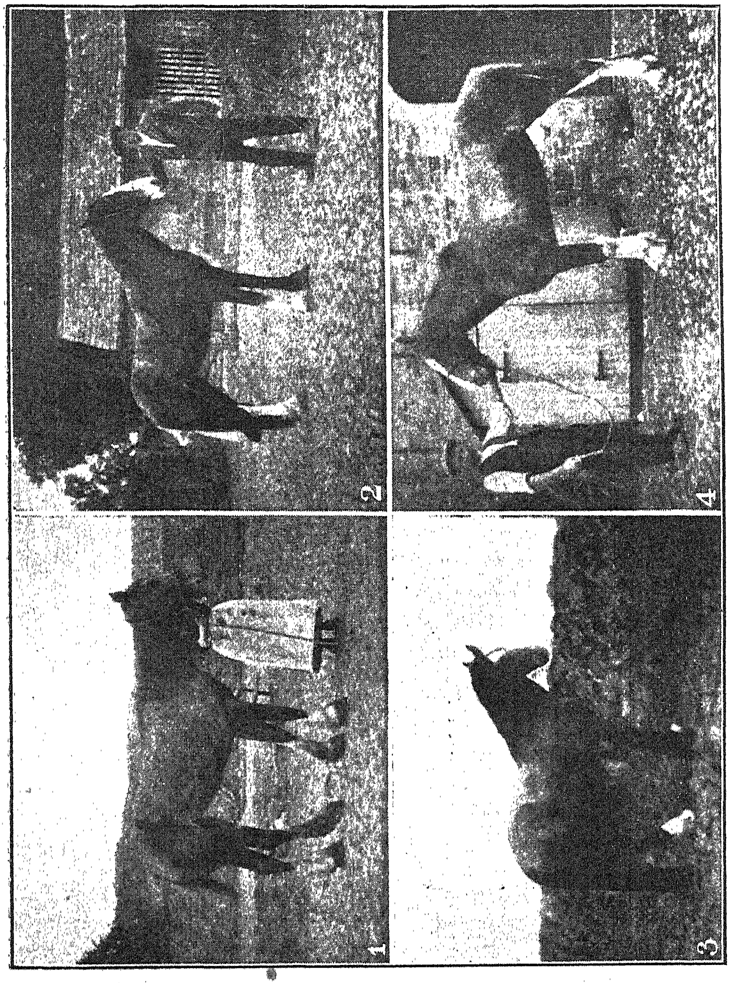
GRASS DISEASE.

WITH PHOTOGRAPHS OF HORSES THAT ARE SUFFERING FROM PARALYSIS OF THE SINGLE COLON OR HAVE HAD PARALYSIS.

By W. T. Hewetson, M.R.C.V.S.,
Brampton, Cumberland.

Photograph No. 1 has just commenced with the complaint; No. 2 has undergone a month's treatment, and has been a fortnight again on grass; No. 3, the horse standing in front, underwent the treatment last year; No. 4 this year.

In this complaint the most critical time, and the time when the case needs the most attention is at the commencement of the treatment. It is very important to get the bowels opened as soon as possible, and it is somewhat difficult to gauge or regulate the precise dose of medicine necessary to do this. When the bowels are made loose there is no necessity to repeat the physic. The laxative diet will accomplish the rest. That is, it will keep the bowels open and rid the system of the poison absorbed and the poison still retained in the bowel. Repeated physicking, or over physicking, has a very bad effect on the heart, which is already affected by the poison generated by the retention and the composition of the ingesta. The horse, if not properly treated, dies from heart failure.



No. 1.—Horse just commencing with "Grass Disease." No. 2.—Horse recovering after a fortnight's treatment and a fortnight at grass. No. 3.—This horse underwent the treatment last year. No. 4.—Underwent treatment this year and recovered.

I have observed, when the fingers are placed in the mouth of the affected horse, a quantity of saliva runs out; the patient will then require a larger dose of medicine to physic him or open his bowels. He should at the same time receive a stimulating ball containing ammon. carb. and nux vomica pulv. This helps the physic to operate.

If the horse should be taken ill on grass away from home, and it should be necessary to take him home, the patient should have the opening medicine before walking him any distance.

Recently I had the misfortune to lose a horse. The owner had a grass park taken four or five miles away from his home. In this park he had a two-year-old Clyandale mare taken ill with the complaint. I saw her in the park and gave her the opening medicine, and as there was not any accommodation or loose box to put her in, she was walked home. The mare's bowels had responded to the physic next day. This mare recovered. About a week later the same owner had another mare taken ill in the same field. He first walked this mare home, and then sent for me to attend. On examining this second case I did not consider it any worse than the first. The pulse, I thought, was stronger and not so quick. A 6-dram physic ball was given and I saw the patient next day, but to my disappointment she had not passed any fæces. A pint of linseed oil was now given, and injections of soap and water given as enemata periodically during the day.

With the first injection a few pellets of dung came away coated with mucus. The mare was visited twice a day. The pulse became weaker and weaker and faster. To an ordinary observer the patient did not appear to be any worse. She died on the fifth day after receiving physic, diffusable and nerve stimulants and injections of soap and water per rectum. All failed to open the bowels. I attributed this to walking the mare four or five miles without first giving the physic. The day she walked home was very hot and she would loose a considerable amount of perspiration which would tend to make her bowels more costive. Had the physic operated this mare would have recovered under the treatment previously described, viz., soft food only, and no other food allowed for one month. In this food a teaspoonful of pulv. nux vomica to be given once or twice daily. On no account must grass or hay or any food be given. The food should have put into it a handful of common salt; the box bedded with sawdust or moss litter so that the patient cannot eat the bedding. One of the chief articles of diet should be *boiled barley* in any form, linseed, milk, boiled oatmeal, boiled turnips—of this he should receive three bucketfuls a day. Allow chilled water to drink, and if he does not care for water give him as much salt as he will take in his food to induce him to drink. The patient should be sheeted to make him comfortable, and under this simple treatment the patient will recover.

No. 2 and No. 3 photographs of the horse had the same appearance as the photograph No. 1 when suffering from the complaint.

[Mr. Hewetson has also made valuable contributions on this complaint on pp. 168, 169, 170 and 171, "V.J." for November, 1920, and pp. 66, 67, 68, 69, "V.J.," February, 1921.—SUB-EDITOR.]

A NOTE ON THE IMPORTANCE OF THE GENUS "HABRONEMA" AS AN ECONOMIC FACTOR AMONGST THE EQUIDÆ OF THE PUNJAB AND THE NORTH-WEST FRONTIER PROVINCE.

BY E. SEWELL, M.C., M.R.C.V.S.,
Post Graduate Professor, Punjab Veterinary College.

IN Fleming's translation of Neumann's Parasitology, "Spiroptera," or, to give them their more modern name, "Habronema," are stated to have slight, if any, pathogenic significance. Anyone who has had experience of the condition and has seen the large suppurating tumours produced by *H. Megastoma* in the pyloric region of the stomach, and the occasional ulceration, inflammation, and congestion caused by *H. Muscæ* and *H. Microstoma* in the cardiac portions of that organ, knows that this statement is utterly at variance with the facts of the case.

This disease in recent years has received a certain amount of attention in Australia and America, and is rightly blamed as being the cause of much loss in both countries.

During the past year the writer has had many opportunities of examining the stomachs of horses and mules which have been destroyed for chronic debility from various stations and remount depots in the Punjab and the North-West Frontier Province.

In every case the stomach was the seat of serious lesions due to the ravages of one or all species of the *Habronema.*

In one case the writer was asked to give his opinion as to the persistent debility shown by a batch of fifty Tibetan mules. The R.A.V.C. authorities concerned kindly placed several old debilitated cases at his disposal. Post-mortems proved that in every case the condition was due to Habronemiasis.

The condition may be recognised by the tumours of various sizes in the case of *H. Megastoma*, and by the large numbers of tiny thread-like worms lying on the mucous membrane of the cardiac portion of the stomach in the case of *H. Muscæ* and *H. Microstoma.*

These are more easily seen if the ingesta is removed from the stomach and the organ placed in a vessel of water, when the parasites can be readily seen floating throughout the liquid.

The life-history of the parasites has been worked out by Bull, Van Sacegham and others, and is briefly as follows:—

The eggs produced by the female *Habronema* pass out in the fæces and are ingested by the fly maggot. These eventually make their way to the thorax and proboscis of the mature fly, and it is supposed that the horse, by ingesting infected flies either in his food or drinking water, infects himself, and thus completes the cycle. *H. Muscæ* and *H. Megastoma* have as their intermediate host the common house fly—*Musca domestica*, whilst *H. Microstoma* develops in the stable fly—*Stomoxys irritans*.

The fly can only become infected as a larva, not as a nymph.

The adult *H. Megastoma* is found enclosed in tumours and seems for preference to select as a site the pyloric portion of the stomach although the lesions may be found in any part of the organ.

These tumours are generally conical in shape, and vary in size from that of a small pea to that of a hen's egg. The tumour is usually full of hard inspissated pus, and a number of worms can generally be seen protruding from a small opening at the apex of the cone and waving in the lumen of the stomach. In some cases there is no opening. It can readily be understood that the portion of the stomach thus affected ceases to function. This species is the most harmful of the *Habronema*.

H. Microstoma and *H. Muscæ* lie loose on the mucous membrane of the cardiac portion of the stomach, and may cause an acute inflammation and congestion. They do not seem to affect the pyloric portion of the organ. *H. Muscæ* is probably the least harmful of the three species.

Lewis and Seddon, Bull and Van Sacegham, have proved that the disease known as "Habronemic Granuloma" is caused by the larvæ of these parasites, *H. Microstoma*, in all probability, being the species chiefly concerned. The condition known in India as "Bursatee," and believed by Lingard to be due to Filariasis, is probably due to the larvæ of the Habronema. When one considers the fly population of India and the construction and sanitation of the lines and stables of the various Army Units and breeding studs, but more so of the civilian population, and the opportunities thus afforded for the spread of any disease from manure in which the fly is likely to act as a carrier, it is quite obvious that Habronemiasis is likely to be responsible for many, if not most, of the chronic cases of debility which must annually cost the Army and the country very large sums of money. Add "Habronemic Granuloma" (Bursatee) and "Habronemic Conjunctivitis," and the importance of the prevention and eradication of this all too often unrecognised condition is at once evident.

Prevention.—Eradication of flies as far as possible, thorough cleanliness and strict sanitation as regards manure are the essentials. There are various methods for dealing with manure. Robaud's method, *i.e.*, burying the fresh dung daily inside a heap of fermenting manure and thus destroying the larvæ of the *Habronema* and the fly maggot, is probably the most simple. However, that is a point that can best be decided by the authorities concerned.

The early isolation of all debility cases, thorough destruction of the excreta when possible, and dosage with a reliable vermifuge (*see* treatment) should be insisted upon as a routine measure.

Treatment.—The work of Maurice Hall and others has shown the great value of *Ol. chenopodii* as a vermifuge. This drug, either alone or in conjunction with chloroform, followed by linseed oil and turpentine, might be tried with advantage.

It should prove efficient against *H. Muscæ* and *H. Microstoma*, and it might be effective against *H. Megastoma.* Carbon bisulphide whose value as an anti-bot agent has been recognised for years, also strikes one as being a suitable drug to try. Van Sacegham regards the destruction of the *Habronema* in the stomach as the ideal preventive measure against summer sores, arsenic up to 2 grains per diem being recommended.

His method of curative treatment for summer sores is as follows :—

Disinfect the sore thoroughly and then apply the following :—

Plaster of Paris	100
Alum	20
Naphthalene	10
Quinine	10

This rapidly dries the sore, prevents the attack of flies and prevents the animal biting itself. He regards it as a specific.

In conclusion, the writer would draw attention to the necessity for careful post-mortems on all debility cases, as it is comparatively easy to overlook the presence of these minute worms, more especially *H. Muscæ* and *H. Microstoma.*

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GASTRIC LAVAGE SALINE TREATMENT IN CASES OF DEBILITY, ETC., BY MEANS OF THE SINGLE STOMACH TUBE.

By MAJOR H. ALLEN, R.A.V.C.
(*Saharanpur, India.*)

THE principles on which the treatment is based are as follows :—

Sodium chloride stimulates and increases secretion of the digestive fluids, furnishes hydrochloric acid for the gastric juice and soda salts for the bile ; in other words, it increases all glandular secretions and circulations of the fluids of the body, and prevents digestive troubles.

It assists in the assimilation of nutritive matters.

It is restorative, stomachic, antiseptic and cathartic.

It is the essential part of the animal fluids and solids.

It promotes excretion of fluid and waste materials.

Large doses of sodium chlorides enable the body to lose correspondingly large amounts of potassium. When the weight of the body increases, the excretion of potassium is likely to increase also. The more there is of potassium the larger is the breaking up of sugar and starches, so there is a decrease in tendency to form fat, and therefore to gain weight. There is no increased loss of sodium when the body gains weight. Vegetable diet provides much more potassium than soda salts, therefore the addition of salt to the diet is necessary for herbivora. Four-fifths of the total amount of salts in the body are a compound of phosphoric acid and lime ; one-fifth consists of potash, soda, iron, chlorine, magnesia, etc. In quantity potash and soda come next to lime and phosphoric acid. Sodium is required for digestion in the duodenum, as alkalinity is necessary. The blood can only carry off carbon dioxide when alkaline. Sodium chloride is therefore needed.

Excessive consumption of salt is said to increase greatly the amount of water excreted in the urine.

It is most important to supply sufficient drinking water during the course of treatment, as otherwise the proportion of water in the body will be lowered by the increased loss through the kidneys, thus leading to greater waste of protein.

Mineral salts are said to control life processes, and so their amounts should be kept normal in the blood, otherwise serious consequences will follow. The kidneys keep up the equilibrium of the mineral contents of the blood by excreting any excess ; but they may not be able to keep the blood normal if the food continues to furnish the blood with a disproportionate amount of salt mixture.

The trend of my argument is that a horse, in a debilitated state, is more or less suffering from a form of mineral poisoning owing to an unbalanced state of mineral matter in the composition of his body, and that the saline treatment rectifies matters.

Appended are a few cases of a series of experiments carried out on "Debility" subjects :—

Eight ounces of common salt in two gallons of water was pumped into the stomach for ten days, and repeated after an interval of a week if no decided improvement was noticed.

As a rule, a shine in the coat is evident after about three days' treatment ; the bowels are loosened in about two or three days, and become normal in another six days. I have never yet had a case of super-purgation.

All cases were weighed before starting the treatment, and re-weighed at intervals afterwards. Some of the experimental cases lost weight at the start of the treatment, evidently due to the excessive thirst causing de-gradation of albumen and the production of urea, owing to the digestive secretions being too dilute, and increased metabolism of the food.

In this connection it is of interest to note that horses in health, and under normal conditions, if allowed to drink as much water as they like, take, for one part of dry matter in the food, two to three parts of water. The external temperature has, of course, a great influence on the quantity, as the heat of the body is lowered in the summer by evaporation of water from the skin. Naturally, in cold weather the evaporation is much reduced.

I have had excellent results in combining linseed oil with common salt in cases of dyspepsia, impaction and sand colic. Three days' treatment, as a rule, cures digestive diarrhœa.

I have found the stomach tube very useful in cases requiring forcible feeding.

Recently imported Walers often go completely off their feed and water during the summer months in this country, and the stomach tube proves itself a godsend.

Combination of salt solution and formalin in treatment of canker cases has given me negative results.

Serial No. of Case.	Treatment started.	Weight before Treatment.		Weight after Treatment.		Result.		Remarks.
		Date.	Weight, lbs.	Date.	Weight, lbs.	Inc., lbs.	Dec., lbs.	
1	22/2/21	22/2/21	820	Evening 28/2/21	866	46	...	Had been in very poor condition since June, 1920. Fair condition March and April, 1921. Now in good condition.
				Morning 29/2/21	862	42	...	
				9/3/21	868	48	...	
				16/3/21	854	34	...	
				30/4/21	890	70	...	
				21/5/21	890	70	...	
				27/5/21	890	70	...	

		Weight before Treatment.		Weight after Treatment.		Result.		
Serial No. of Case.	Treatment started.	Date.	Weight, lbs.	Date.	Weight, lbs.	Inc., lbs.	Dec., lbs.	Remarks.
2	22/2/21	22/2/21	1098	28/2/21	1110	12	...	Condition very poor. A very weak constitutioned horse, frequently suffered from diarrhœa. Always suspected "Strangylosis" being the chief cause of his condition. Had received frequent intravenous injections of atoyxl and normal saline solution without any appreciable result. Eventually "cast."
				8/3/21	1068	...	30	
				15/3/21	1064	...	34	
3	24/2/21	24/2/21	1080	2/3/21	1096	16	...	Condition fair. Still under treatment.
				10/3/21	1116	36	...	
				13/3/21	1140	60	...	
				17/3/21	1100	20	...	
				27/5/21	1120	40	...	
4	24/2/21	24/2/21	1060	2/3/21	1112	52	...	Condition fair. At present suffering from skin disease (*Lichen Tropicus*).
				10/3/21	1138	78	...	
				13/3/21	1160	100	...	
				17/3/21	1140	80	...	
				27/5/21	1130	70	...	
5	23/2/21	23/2/21	894	2/3/21	895	1	...	Arrived in January, 1921, in poor condition. Now in fairly good condition, but requires more muscle on back and quarters, which he is putting on rapidly, with long, slow work.
				10/3/21	922	28	...	
				14/3/21	960	66	...	
				18/3/21	984	90	...	
				9/4/21	985	91	...	
				2/5/21	996	102	...	
				23/5/21	986	92	...	
				27/5/21	987	93	...	
6	19/2/21	19/2/21	988	5/3/21	970	...	18	Has been in very poor condition since October, 1920. Now carrying a healthier coat.
				16/3/21	936	...	52	
				27/5/21	938	...	50	
7	20/2/21	20/2/21	940	5/3/21	926	...	14	Starting to improve.
				16/3/21	910	...	30	
				27/5/21	912	...	28	
8	20/2/21	20/2/21	936	5/3/21	960	24	...	Arrived April, 1920, in poor condition. February, 1921, condition fair. Now in good condition. A horse with a weak constitution.
				16/3/21	976	40	...	
				30/4/21	976	40	...	
				23/5/21	992	56	...	
9	20/2/21	20/2/21	1066	5/3/21	1080	14	...	Starting to improve.
				16/3/21	1074	8	...	
				27/5/21	1074	8	...	
10	9/3/21	9/3/21	1092	15/3/21	1132	40	...	Issued to service.
				28/3/21	1120	28	...	
				5/3/21	1132	40	...	
11	9/3/21	9/3/21	890	15/3/21	890	...	...	Still under treatment Has been "poor" since January, 1921 Now in fair condition.
				28/3/21	880	...	10	
				8/4/21	894	4	...	
				27/5/21	897	7	...	

Serial No. of Case.	Treatment started.	Weight before Treatment.		Weight after Treatment.		Result.		Remarks.
		Date.	Weight, lbs.	Date.	Weight, lbs.	Ins., lbs.	Dec., lbs.	
12	9/3/21	9/3/21	808	15/3/21	812	4	...	
				28/3/21	808	...	...	
				5/4/21	808	...	...	
13	9/3/21	9/3/21	984	15/3/21	992	8	...	Still under treatment.
				28/3/21	960	...	24	
				5/4/21	996	12	...	
				27/5/21	984	...	...	
14	11/3/21	11/3/21	808	19/3/21	810	2	...	Still under treatment.
				28/3/21	840	32	...	Improving rapidly.
				5/4/21	852	44	...	
				27/5/21	880	72	...	
15	18/3/21	18/3/21	910	28/3/21	930	20	...	Still under treatment.
				27/5/21	972	62	...	
16	28/3/21	28/3/21	1046	5/4/21	1136	90	...	Still under treatment.
				27/5/21	1142	96	...	

HYDROPS AMNII.

By W. R. DAVIS, M.R.C.V.S.,
Enfield.

In June last I was called to a cow seven months' gone in calf, and found the animal to be tympanitic and showing a good deal of distress. There was considerable swelling in both flanks, particularly marked on the right side, where the skin over the swelling was very tense. I gave a draught containing turpentine and oil of peppermint, and went off to another case, returning in about an hour.

As the medicine had afforded no relief I punctured the rumen and let out a fair amount of gas, but the swelling did not go down, as it usually does after tapping, and was still present on the right side. I could feel the rumen actively moving while I held the cannula, and now, as no more gas was passing, I again inserted the trocar. The cannula must have slipped out of the rumen, because, when the trocar was pushed home, I felt it go through a resisting structure, and when the trocar was withdrawn, instead of gas, a straw-coloured fluid gushed out and I knew that the cannula was in the uterus. The instrument was left in position with the fluid pouring out.

In the afternoon I again saw the cow, and informed the owner that she was not going to do any good, and he at once sent for the butcher. There were two calves in the uterus, which was dilated, the walls being attenuated and pale. The fœtal membranes appeared to be friable and thinner than usual. The quantity of fluid was enormous—20 gallons at least.

There was nothing in the cow's appearance when first seen that might suggest one had to deal with anything but a tympanitic rumen. The belly was not pendulous, and the cow was in very good condition.

I have previously inserted a large sound through the *os uteri* and drawn the fluid off to relieve this condition. The calf is always born dead, but the cow may do well. It is well, before puncturing pregnant cows for tympany, to make sure that hydrops of the membranes is not present. Probably this affection is the cause of the tympany.

A CONTRIBUTION TO THE STUDY OF TUMOURS OF THE DOMESTIC FOWL.

By B. F. KAUPP, V.S.

From the Laboratory of Poultry Pathology, North Carolina Experiment Station, State College Station, Raleigh, N.C.

A COMPOUND TUMOUR OF A GOLDEN WYANDOTTE COCK.

While simple tumours, that is, tumours of but one kind of tissue, are the prevailing kind in both benign and malignant types, yet it is not unusual to find tumours made up of two or more kinds of tumour tissue. The tumour cells always resemble some normal body cell or cells either in adult or in embryonic formation.

A Golden Wyandotte cock, two years old and a member of the breeding birds of the Station Poultry Plant, died on April 15, 1921, and was sent to the laboratory for post-mortem. The cock had failed to fertilise the eggs of the hens with which he was mated, but his appetite and general appearance remained good, and no serious physical condition was noted till shortly before death.

Upon opening the abdominal cavity there was noted about 100 cc. of a straw-coloured fluid, and a very large tumour, involving the right abdominal air sac. There was also a small tumour on the left lobe of the liver. This is one of the most unusual tumours, both in size and in general tumour make-up, that we have ever studied. The tumour was placed in a 10 per cent. solution of formaldehyde and several days later was sectioned. The tumour measured 15×10×9 cm., and the sectioned surface indicated a compound tumour, which later was confirmed by microscopic study. Islands of bone surrounded by hyaline cartilage were observed, and can be detected microscopically as pointed out in the photograph (marked 1). Fatty areas were also present, and shown at the place marked 2. Cysts, pointed out at number 4, are also observed. These cysts vary in size up to 13 mm. in diameter and contain a gelatinous substance more or less the colour of serum. Here and there are whitish areas, indicated by 3, which may possibly contain more or less connective tissue and cellular substance. At No. 5 will be noted an aneurism, which plainly shows the coagulated blood laid down in layers. It will be seen that the whole tumour section lacks uniformity in appearance, looking as though there were many kinds of tissue making up the whole tumour. Surrounding the whole tumour there is a thin fibrous capsule.

Microscopic Study.—After hardening blocks of the tumour tissue in formalin, dehydrating first in alcohol, then alcohol and ether, and embedding in paraloid, sections were made and stained in hematoxylon and eosin, and clarified in beechwood creosote.

Adenomatous and Cystomatous Areas.—Here and there throughout the tumour, shown at 3, are areas in which has developed typical gland tissue. These glands vary in size from microscopic to 13 mm. in diameter. In the smaller glands their cavities are lined with cuboidal cells, and as the size of the glands increases the lining cells become higher, till high columnar cells are observed. One of the very largest cysts is seen at 4.

Cartilaginous and Osseous Areas.—Parts of the tumour show typical hyaline cartilage, and in many instances the central core of these parts has become calcified into true bone (No. 1).

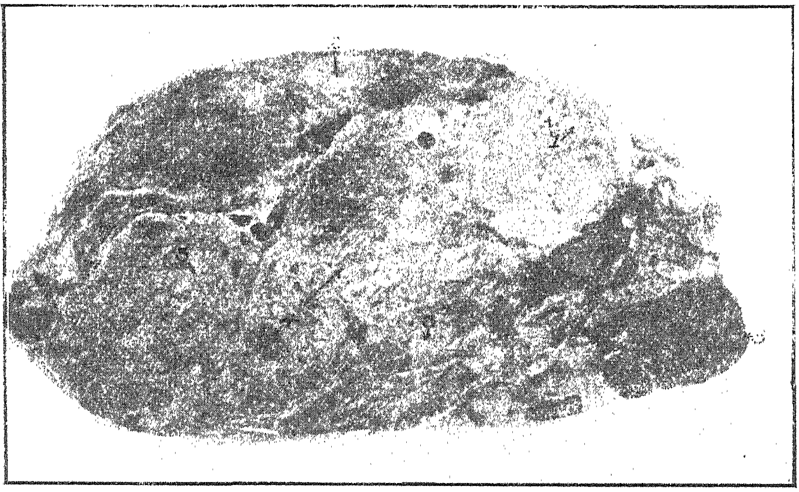


FIG. 1.—Cysto-Lipo-Chondro-Osteo-Adeno-Carcinomata of a Golden Wyandotte Cock. 1, Cartilage and bony area ; 2, fatty tissue ; 3, adenomatous and carcinomatous zone ; 4, cysts ; 5, aneurism.

Carcinomatous Areas.—Some of these parts (pointed out at No. 3) show cavities filled with adult type epithelial cells, and these masses are surrounded by adult type connective tissue. These are areas of true carcinoma. Carcinoma we have found to be quite rare in the domestic fowl—in fact, this is the first true carcinomatous tissue we have observed, though epitheliomas of the skin structure we have frequently seen.

Lipomatous Areas.—Areas, as pointed out at 2, are made up of fatty tissue.

Microscopic Diagnosis.—Cysto-Lipo-Chondro-Osteo-Adeno-Carcinomata.

LYMPHO-SARCOMA OF A SINGLE COMB WHITE LEGHORN COCK.

The subject of this study is a three-year-old Single Comb White Leghorn cock, No. 1014, a grandson of the Baron hen who won first in the International Egg-Laying Contest at Mountain Grove, Missouri. This cock was hatched in the spring of 1917. He was used in the breeding pens of the station for three consecutive years. In October, 1920, it was noticed that the bird had developed a tumour on the right forearm. This tumour was removed on October 8, and the wound was painted with pure tincture of iodine. The tumour measured 4×1·5 cm. Cultures were made from the tumour that was removed, thinking possibly we were dealing with an infection. A rabbit was also inoculated from an emulsion of the tumour. An abscess developed at the point of inoculation. Later, an examination showed that the tumour was recurring, and on the 14th three other tumours were removed from the upper cervical region. These tumours were confined to the skin and measured 1×0·75 cm. in diameter. Upon cutting the tissue, it appeared like sarcomatous tissue, although at that time no sections were made for study. The bird died on November 10, 1920.

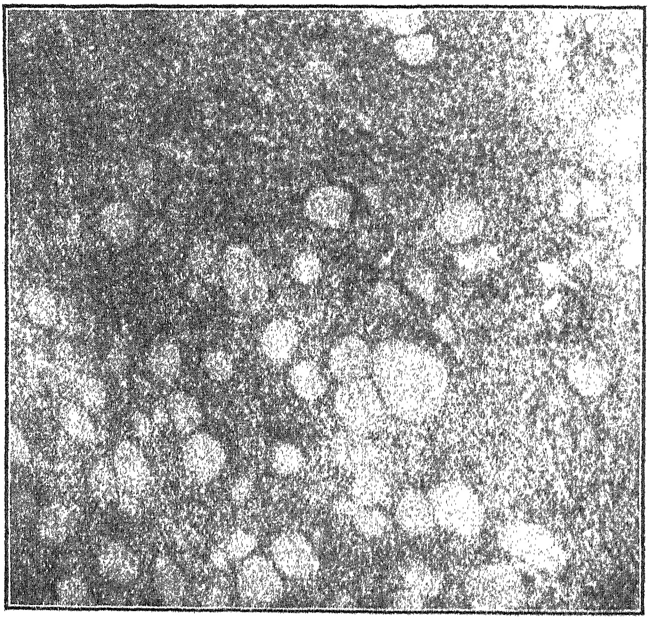


FIG. 2.—Lympho-Sarcoma of a White Leghorn Cock.

Post-Mortem.—Upon opening the abdominal cavity, there was found partially coagulated serum amounting to about 25 cc. The liver is in a state of chronic inflammation. The kidneys are pale, and show evidence of a state of cloudy swelling. In the cæcal wall there are observed four tumours about 1 cm. in diameter. There is a tumour of the mesentery measuring 2·5×3 cm. There are eighteen tumours of the skin.

A microscopic study of sections of various tumours showed a round, celled lympho-sarcoma.

MYXO-SARCOMA OF A BARRED PLYMOUTH ROCK HEN.

Sarcomas are malignant tumours formed on the type of connective tissue, but they are, as a rule, largely composed of cells ; the basement substance, though a constant and important factor, being much less conspicuous than in adult connective tissue. They closely resemble, in general, the developing connective tissue of the embryo or granulation tissue of inflammation.

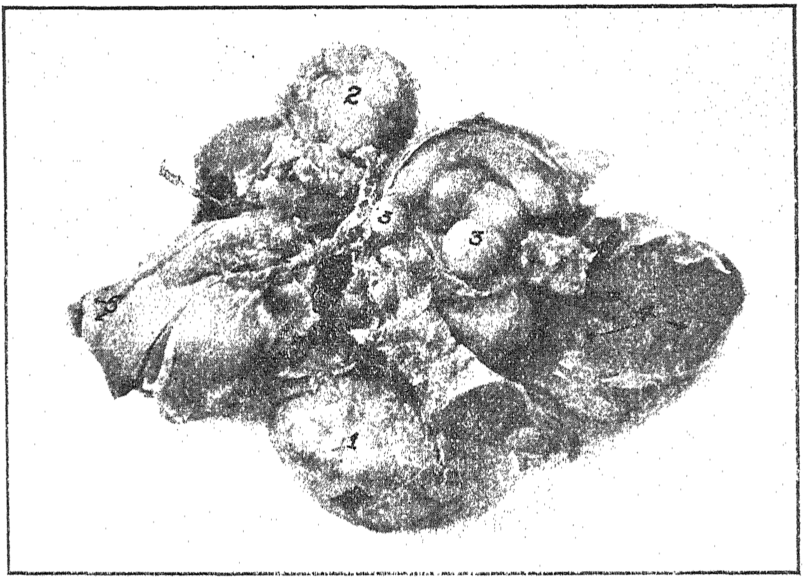


FIG. 3.—Myxo-Sarcoma of a Barred Plymouth Rock hen. 1, 2, and 3 are tumours of the liver ; 4, are small tumours developing in the liver substance ; 5, are two small tumours of the pericardium at the apex of the heart.

The cells of sarcoma may be varied in size and shape. They may be flat, fusiform, spheroidal, or branched, and even cuboidal or cylindrical ; they may be multinuclear and very large, or they may be small and spheroidal, resembling leucocytes. The fibrillar basement substance may be present in such small quantities as entirely to escape a superficial observation, covered as it may be by the abundant cells, or it may be so abundant as to give the tumour the general appearance of a fibrona.

Mucous degeneration is frequent in the various forms of sarcoma. A combination of myxoma and sarcoma, myxo-sarcoma, is common in animals and in man. The present case is the first case we have studied in the domestic fowl.

A Barred Plymouth Rock hen three years old, in feeding experimental work, is the subject of this discussion. This hen appeared in excellent health till a very short time before death.

Post-mortem.—Upon opening the abdominal cavity, numerous round white tumours were observed involving the viscera. No. 1 shows a tumour which measures 38×30×23 mm.; this tumour is attached to the under side of the right lobe of the liver. No. 2 is the second largest tumour, and measures 28×22×15 mm., and is attached to the anterior and inner part of the right liver lobe. There are several, twenty or more, smaller tumours as illustrated by No. 3. These tumours varied from 10 to 15 mm. in diameter. In addition, there were still smaller tumours embedded in the liver substance as illustrated at No. 4, and these measured from 1 to 4 mm. in diameter. In addition to this, tumours were distributed over other organs, there

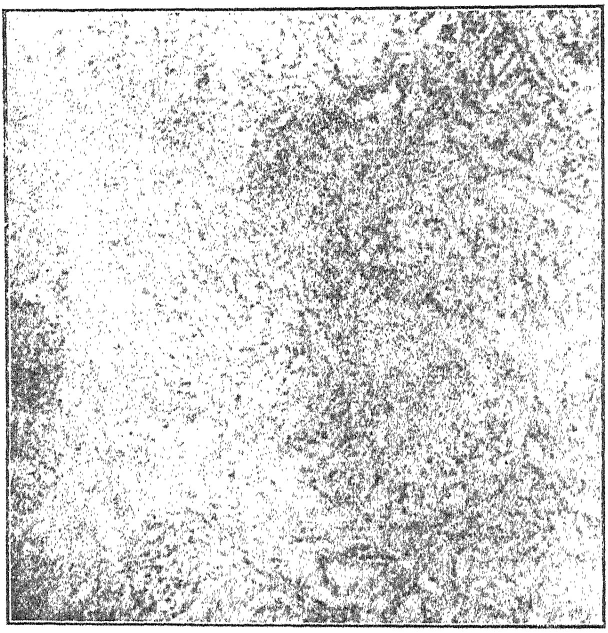


FIG. 4.—A photomicrograph of a section of one of the tumours shown in Fig. 3, showing myxomatous area. Note the spindle and stellate cells.

being three involving the pericardium at the base of the heart, and two of the same membrane near the apex, as shown by No. 5.

The balance of the organs are apparently in a normal state.

Sections were studied from various of the tumours.

The tumour consists of various types of cells. It is composed largely of cells; most areas show nothing else. Here and there throughout the tumour may be seen very small groups of adult connective tissue, cells with very long, slender nuclei, but the major part of the tumours are made up of large spindle cells lying in bundles, and areas cut crosswise appear on transverse section, with large nuclei, with a small amount of cytoplasm surrounding the nuclei. Another type cell is observed, one that is often observed in sarcomas. This is a very large cell, with sometimes one, and at other times two large, irregular-shaped nuclei. In fact, these cells are giant in size.

In some areas there appears myxoid degeneration. Fig. 4 brings out the appearance of one of the myxomatous areas. In this picture can be seen the spindle and the stellate cells, with only a moderate amount of basement substance. The basement substance is of a homogeneous nature. These areas represent typical mucous tissue.

AN INTERESTING TUBERCULOUS SPLEEN.

By FRANK CHAMBERS, O.B.E., F.R.C.V.S.,
Wolverhampton.

The subject was a seven-year-old bull-dog, which had been ailing for twelve months. He was very emaciated, abdomen distended, and showed no inclination to move or take any interest in life. The owner stated that he would improve tremendously for a few weeks, and would eat well, only to relapse into his usual lethargic state. The post pharangeal glands were enlarged, and a large spleen could be felt quite easily. I diagnosed tuberculosis and advised destruction.

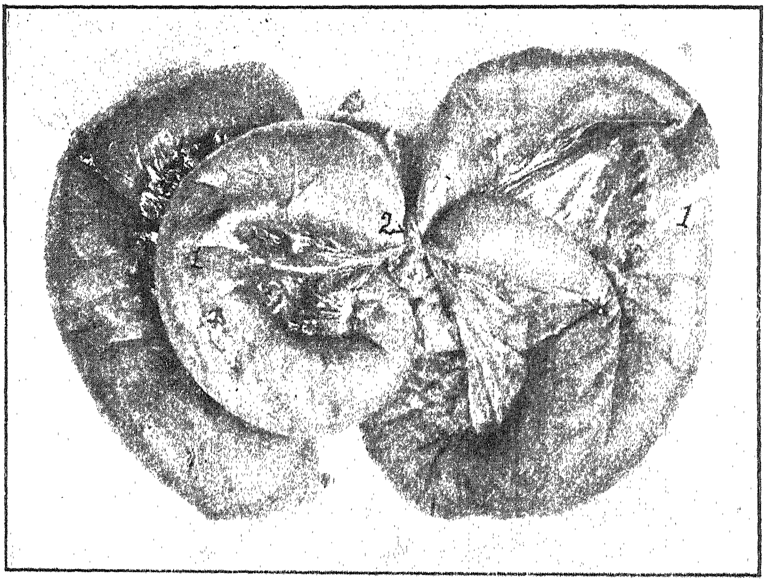
Autopsy revealed a very much enlarged spleen, measuring 16 inches long and 5 inches wide at its greatest width. The weight was 3 lbs. 2½ ozs., and contained numerous tubercular foci in the different stages of casention, etc. The intestines, liver and kidneys were normal. Lungs normal, but the post-pharangeal glands were infected and very much enlarged.

VOLVULUS OF THE FREE PORTION OF THE SMALL INTESTINES OF THE HEN.

By B. F. KAUPP.
From the Poultry Pathological Research Laboratory, N.C. Experiment Station, State College Station, Raleigh, N.C.

WHILE volvulus, or twisted bowel, is extremely rare in the bird, it is often observed in mammals. The writer has observed it in autopsies of horses dead of colic. Volvulus also occurs in the cow, where the symptoms are also those of enteritis and obstinate constipation.

History.—A Single Comb Rhode Island Red hen, one year old, which had just died, was brought to the laboratory for diagnosis. Two or three hens had died, and it was feared that cholera had attacked the flock. An autopsy was held for the purpose of determining the cause of death. All organs were normal except the condition to be described in the intestines.



Volvulus was observed in the free portion of the small intestine. The figure shows four loops of the small intestine, inflated to some extent by gas, and showing intense passive congestion, the intestine being black in colour. At 2 will be seen a part of the free portion of the small intestine, which, passing through a rupture of the mesentery, has tightly tied and strangulated this portion, stopping all circulation, and causing passive congestion, thus leading to death of the strangulated part.

Obituary

We were sorry to learn of the death of Mr. Duncan M'Naught Gardner, M.R.C.V.S., which took place at his residence, Springvale, Helensburgh, on Tuesday, September 6.

Born at Overton Farm, Alexandria—a "son of the soil"—he entered the Glasgow Veterinary College, then situated in Parliamentary Road, and under the late Principal M'Call, in April, 1873, gained his diploma, and was admitted a member of the Royal College of Veterinary Surgeons. Proceeding to Helensburgh, the same year he set up practice, and later opened business as a grain merchant, which formed one of the most extensive connections in the West of Scotland. He was for over forty years Veterinary Inspector under the Diseases of Animals Act for the Eastern Division of Dumbartonshire, and only resigned a few years ago owing to ill-health. Mr. Gardner was a good judge of a cart horse, and owned many first-class driving hacks. His figure was a familiar one for many years on the road and at cattle shows in the West, where he was often asked to judge light-footed horses.

Mr. Gardner was seventy-three years of age and is survived by a wife, one daughter, and seven sons, six of whom served with the colours as combatants overseas in various fronts in the great war, and, though two of them were severely wounded, all survived. The sympathy of a very wide circle of friends will be extended to Mrs. Gardner and her family.

Review.

VETERINARY MATERIA MEDICA. Fifth Edition. Issued by Parke, Davis & Co., 50-54, Beak Street, Regent Street, W.1.

THIS is a handy little book of 191 pages with an index. It is one which will be of great service to the veterinary practitioner, as the arrangement of the matter is quite plain and so divided up that it is quickly accessible for reference. The high standard that the firm has always aimed at in the manufacture and production of its therapeutical agents is well known, and practitioners feel from experience that they are safe and up-to-date when employing the healing and preventive preparations of the house. Serums, bacterins, vaccines and organic products have good descriptive sections. Biological therapy and hypodermic medication receive full consideration and antiseptics, and germicides are amply dealt with. The Colonial practitioner will welcome a section on "Diseases of Camels."

Equipped with this book and a fair number of the products described therein and supplied by the firm the veterinary practitioner will be well able to deal effectively with most of the cases he comes across each year. We commend the firm for producing such an excellent little work and we advise all practitioners to apply for a copy.

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THE LATE CAPT. HARRY CHOWNE, R.A.V.C
(*Killed in Action in the Soudan, September,* 1921.)

THE

VETERINARY JOURNAL

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Sub-Editor :

GLADSTONE MAYALL, M.R.C.V.S.

NOVEMBER, 1921.

THE LATE CAPT. HARRY CHOWNE, R.A.V.C.

CAPT. CHOWNE was killed on September 26 last, together with Mr. McNeill of the Sudan Civil Service, and three Civil employees, as the result of a native rising against the British Garrison in the Sudan, at Nyala, Southern Darfour. Born at Mapledurham, near Reading, the deceased officer was only 30 years of age. Graduating at the Royal Veterinary College, Camden Town, in December, 1914, he at once took a commission in the Special Reserve and was granted a regular commission as Captain in September, 1915.

Serving in various capacities during the Great War he will probably be best remembered by old friends as the popular commanding officer of the 48th Mobile Veterinary Section of the Ulster Division, with whom he remained until September, 1918, when he was seconded for service with the Egyptian Army. At the time of his death he was the District Inspecting Veterinary Officer for Southern Darfour. His war record included a "mention in despatches," the 1914-15 Star and the Allied and Victory Medals.

Editorials.

MISERABLE SALARIES! THE EXAMPLE OF OUR COLLEAGUES IN THE HUMAN MEDICAL PROFESSION AND A COMPARISON.

THE sarcasm expressed by Lord Lambourne in an article written for *The Nineteenth Century* for the salaries offered to (and, unfortunately, accepted by) members of the veterinary profession for a whole-time position might well be taken to heart at the present time when the cost of living is so high and house rent so exorbitant. The distinguished writer, who is well known as a friend to any object which checks cruelty to animals, alludes to the "princely salary of £300 a year" offered by the Ministry of Agriculture to properly qualified and experienced members of the Royal College of Veterinary Surgeons selected as Port Veterinary Inspectors, and states significantly, "because of this parsimony they have to be pensioned professional gentlemen," a fact, unfortunately, too true unless their whole existence is to be a constant struggle to maintain even a genteel poverty. And in order to demonstrate that this parsimony is not necessary from the taxpayer's standpoint he quotes that questions and answers in the House of Commons had elicited "that the fees for examining horses for export in 1920 brought in a total sum of £14,594, whilst the cost of these examinations had only amounted to £4,006. This shows a clear gain to the Government of over £10,500. One would like to know what became of this balance! Surely the labourer is worthy of his hire, and, if the Minister has any faith in his reformative measures, I would beg that more adequate salaries be given to avoid the temptations which, alas, seem inevitable where the buying and selling of horses are concerned." Comment on the above seems superfluous; it is the spontaneous outburst of a distinguished layman who is well disposed towards our profession and who understands full well the potentialities of its mission as *the* profession which teaches and practices the healing art and the application of methods of alleviating pain in dumb animals; creatures whose very helplessness to do such things for themselves ennobles our profession and makes our life's study a truly high and merciful calling. He recognises that to offer a miserable £300 a year as the whole-time salary for a professional man, who has spent at least £1,000 on his professional education, and to expect him to keep up a social status which shall be a credit to his profession, is "parsimony," and he is justified in sarcastically alluding to it as "princely."

One wonders what he would say if he was a regular reader of the advertisement columns of our veterinary periodicals and saw that the same Ministry of Agriculture offered for competition whole-time Government billets for duly qualified veterinary surgeons at £200 a year; or indeed, again, that another institution advertises for a Demonstrator, who presumably must be a duly qualified graduate, possessed of more than usual ability in order that he may shine as an example to the students whose classes he will control, for £150 per annum. On this he is expected to keep himself, wear a black coat and other external signs of professional respectability, live in a respectable neighbourhood, and generally comport himself as a selected specialist should. The road sweeper of some of the Borough Counuils is better off, for he, at all events, claims his £4 a week and only works 48 hours a week for it, Saturday afternoon and Sunday being playtime. That men can be found eager and willing to take such pittances shows quite clearly that there is something wrong with the internal organisation of our profession. *In fact, it points to the absence of organisation.* and we might well take a leaf out of the book of our medical *confrères*. Recently, the position of Medical Officer of Health for Stirling, a whole-time job, fell vacant, and the town council suggested a salary of £600 a year, which a higher authority under the Board of Health whittled down to £500. However, the British Medical Association, which can probably now be likened to one of the most powerful Trade Unions in the world (and whose example our National Veterinary Association might do worse than copy in many things) have already decided that no whole-time appointment of this magnitude and responsibility should be taken under a minimum salary to commence with of £700 a year. The consequence is that the appointment is boycotted by all the best and most intelligent, self-respecting, medical men; and, in instances in which a boycotted position has been filled by some second-rate individual, disloyal to the interests of his profession, those who had the giving of the appointment have been only too glad to yield and give the higher terms.

In the *British Medical Journal*, the official organ of the British Medical Association, there is published from time to time a black list under the following heading:—"Medical practitioners are requested not to apply for any appointment referred to in the following table without having first communicated with the Medical Secretary of the British Medical Association, 429, Strand, London, W.C.2." Then follows a list of doubtful appointments in Great Britain and the Colonies, and by this means the young graduate receives a measure of protection and the pecuniary and professional status is clearly defined, so that he has no need to put his head into a noose unwittingly.

Presently, when the National Veterinary Association gets well on its feet, it could do good work for its members, especially the younger ones, by indicating the futility of becoming genteel slaves. *It is not necessary, and only needs combination to resist such insulting offers. We, as veterinarians, are absolutely an integral and essential factor for the health and wealth of agriculture (and this means the State), and we are essential to the Public Health.* Nothing can gainsay this; for if veterinary control was withdrawn our flocks and herds could not exist, and meat and milk for human food could not be relied on. Diseases of animals contagious to man would spread, and altogether, in a very short time, there would be chaos.

Why, then, submit to this social drudgery? We are a poor profession, and we shall always be so as long as we are disloyal to ourselves and submit to it. Let our National Council give a lead in the matter and our young and impecunious graduates will readily respond. The Councillor who introduces the subject and takes a firm stand in this matter will earn the gratitude, not only of the present graduates, but of all those who are to come. Money is by no means everything, but it buys so little at the present day that a man has to look about and find all he legitimately can of it; and although poverty may be no crime, when one has a position and a family to keep up it is apt to be, at times, a little inconvenient.

THE VALUE OF THE NATIONAL VETERINARY BENEVOLENT AND MUTUAL DEFENCE ASSOCIATION.

THE National Veterinary Benevolent and Mutual Defence Society still continues to do good work and every young graduate, in particular, should enter its portals. Apart from the Benevolent side of its nature, the Defence side should appeal to him very strongly, as the moral backing of such a powerful society would give him courage in fighting any legal action which a cantankerous or hysterical client might bring against him. To the older practitioner too it will always prove a comrade, for not only does a practitioner with an action hanging over his head get moral support, but he has only at any time to state his case in order to get the ripe and sound opinions of the Council, which consists of a number of practitioners of mature years, well acquainted with the wiles and malicious ways of litigious clients.

Several cases have been backed up in this way, morally and financially, lately, notably one in which a well-known veterinary surgeon was prosecuted by a widely-known Animal Society for alleged cruelty to a dog, by permitting lice (on the evidence of the prosecuting Society), to exist on its body whilst in his infirmary. According to the report given in the local press an attempt was made (on the word of a local chemist) to prove that these parasites caused it great pain. In fact the chemist, in his ignorance, poisoned it; and another lay witness who exhumed the body some days after burial, had the audacity to state that from the vermin he found then he considered that the animal must have been in pain.

Needless to say, no veterinary evidence was given for the prosecutors, who lost the case, and were mulcted in costs, but the attempt to get a conviction had been made, and the fact that the National Veterinary Defence Society was behind our veterinary *confrère*, must have considerably eased his mind and proved a great moral force in assisting him to fight and win the unwarranted and stupid accusation made against him.

" FLY-STRUCK."

ON a further page we publish a cutting from the daily Press which appears to indicate that the spread of trypanosomiasis is giving trouble in South Africa and can well understand the alarm felt by the farmers and settlers of Zululand at the increase amongst their stock of cases of this disease and the heavy death toll caused through the same. To judge from recent Press notices their difficulty has been represented to the Government of the Union of South Africa and they have formally laid before one of its Ministers a presentment of their case, asking for indemnification for past loss and pointing out that—in certain districts—farmers have been denuded of stock by the ravages of the disease to such an extent as to render future farming impossible and the surrender or sale of the farm inevitable. While sympathising with the troubles of the farmer the Minister is reported to have declined financial assistance but strongly to have advised the settlers not to sell or abandon their farms as "no parts of the Union had greater potentialities" than the unfortunate district in question. This official attitude reminds us of the attitude of the crowd collected to witness the burning of the heretic Jew, and who—fearing the recanting of the prisoner at the last moment and the consequent cancelling of the holiday spectacle—endeavoured to fortify the victim as he approached the scaffold with shouts of " Stand fast, Moses."

However this may be, the position of the settler who is unable to keep his stock alive is obviously an impossible one, and such an incident serves to remind us in a salutary manner both of the advantages of living in a well-settled country and of the struggle against adverse circumstances which our settlers and pioneers are called upon to face in the building up of our Empire. The phrase " fly-struck " may mean little to us, but to the pioneer settler, who is liable to find his favourite saddle-horse suddenly fail him, or whose only plough and transport ox-team becomes threatened with rapid extinction—with all the tragic consequences which attend such a happening—the words "fly-struck" have an ominous significance.

As is well-known, the disease N'gana or Nagana is a deadly form of trypanosomiasis inoculated into animals by the Glossina morsitans or "Tse-tse fly." This fly becomes itself infected by sucking the blood of certain species of big game, such as the African buffalo, the bushbuck, koodoo, wildebeeste, and zebra, which animals form a natural reservoir for the disease by tolerating and maintaining in their blood the trypanosome in question.

It is against the zebra especially that the Zululand farmer is now appealing, for large herds of these beautiful but useless animals inhabit northern Zululand, generally in close association with the wildebeeste.

Hitherto the game-hunter has spared the zebra, which has existed unmolested save by the lion, and this immunity from man's attack has been due as much to the fact that the zebra until lately has been supposed free from the risk of conveying the disease nagana as from a natural reluctance to shoot wantonly an animal so resembling the horse in shape and so graceful in colour and action.

Now, however, it seems we must apply the old adage "Handsome is as handsome does," and the zebra's gaily painted coat can no longer save him from inclusion in the proscribed list.

If the fly—Glossina morsitans—could by any means be exterminated the life-cycle of the trypanosome would be broken, as no means would then exist for the latter's transmission to its ultimate animal host. This policy of fly extinction appears less hopeless than would at first sight seem possible, inasmuch as the normal habitat of the fly is restricted to certain well-defined wooded regions or "belts," and it is urged either that the destruction of these belts or the making of such belts inaccessible to big game would prevent the further spread of disease. Both these policies would, however, entail enormous effort and expense, and the driving away or the extermination of the big game itself is found the most practicable way of preventing the extension of the disease to the domestic animals of the white farmers, for it is found that the fly follows the immigrations of the big game and so remains always in close association with these normal reservoirs of the trypanosome.

The whole problem, indeed, is greatly increased in gravity by the finding in recent years that the Glossina morsitans is capable also of transmitting another trypanosome (T. rhodesiensis) to man himself, thereby inducing the deadly disease, Sleeping-sickness.

The introduction, therefore, of a case of sleeping-sickness into a district such as Northern Zululand, where the Glossina morsitans abounds, would be likely to lead to the permanent establishment of this dreaded disease in the centre of the white population.

Such a happening would, indeed, render the lot of the East African settler an unenviable one, and we can well understand and sympathise with the anxious deputation of Zululand farmers in their appeal to the Union Government for some amelioration of their condition in respect both to past loss and future risk.

SLEEPING SICKNESS AMONG CATTLE.

A NEW PERIL IN SOUTH AFRICA.

"Nagana," a sleeping sickness which is devastating stock of all descriptions in Zululand, is bringing many of the young settlers in the country face to face with ruin. The infection is carried by the tsetse fly, and it is generally agreed that big game, especially zebra, is largely responsible for the spread of the disease.

The farmers of N'Tambanana recently met to discuss with Colonel Reitz, the Minister of Lands, the possibilities of financial relief, pointing out that all their capital had been invested in stock which had been carried away by nagana before they could make any profits. Colonel Reitz said that, although the Government fully sympathised with the plight of the settlers, it could not grant financial help, but was willing to make what concessions it could in the way of allowing settlers to sell their holdings and not pressing for instalments of rent, etc. He urged them, however, not to sell, as no part of the Union had greater potentialities.

It is the general opinion among farmers that if the farm and bush are cleared of big game nagana will disappear; it is suggested that the Government might do away with the game reserve, except for one sanctuary in the north, make shooting free, and give, say, 500-acre holdings to applicants who would clear them and thus make an anti-fly belt.

Although human sleeping sickness and nagana are known to be conveyed by distinct species of tsetse fly, it is apprehended that the nagana fly may be capable of also conveying sleeping sickness to human beings, once the infection is introduced into the country by human hosts. The nagana area stretches to within only a fairly short distance of large centres of population, which materially increases the urgency of the matter.—*The Observer.*

Clinical.

CLINICAL FRAGMENTS.

By F. J. HARVEY, F.R.C.V.S.
(*St. Columb, Cornwall*).

VAGINAL HÆMORRHAGES IN MARES.

THERE does not appear to be any description in veterinary literature, at least the writer has met with none, of a condition affecting mares in which there is frequent passing of blood *per vaginum* for quite lengthened periods, and which may ultimately result in the establishment of a severe or marked anæmia. The condition is not common but I have encountered two cases within a year, whilst I have met with perhaps half a dozen or more in the course of practice.

Most of the animals have had youth on their side and two at least have been known to have been pregnant at the time of the hæmorrhage. Seasonal incidence has been lacking and of the last two cases, one occurred in the month of November, and the other in June. As to recurrence, one mare only has been noted as having had a return of the bleeding, and here it occurred on two subsequent periods separated by a year or more from one another. It is interesting to note that the latter animal had a marked varicosed condition of the veins of her mammary region, and was of a very lymphatic temperament. The mares have been mostly of the shire type, and one commenced bleeding after doing some heavy haulage, and had been bleeding more or less a month before coming under treatment. The condition seems to have little or no definite connection with the parturient state or oestrum.

Symptoms.—Attention may be first directed to the animal by the presence of dried blood on the hair of the tail, and on the hocks and feather below, or perhaps fresh blood may be passed after micturition, or in other instances old blood-clot will be found on the ground. In the early stages the general health has not been interfered with, fever, pain and stiffness being absent and the appetite good. The amount of hæmorrhage will determine the degree of wasting which follows. If the mare is in good condition, she soon loses her bloom, becomes pitch-haired, sluggish in her movements and easily run down. In long cases or neglected ones, the mucous membranes become pale and a general anæmic state is established, with considerable loss of body weight. On examination the vaginal passage is usually found to contain old and new clot and liquid blood. There is no evidence of inflammation or thickening of the walls of the organ or of the uterine os, the latter being in a rather flabby or toneless condition. If the contained blood debris be removed, the part washed, and the hand then allowed to rest quietly in the cavity for a minute or two, and then carefully withdrawn, the presence of fresh bloodstain on some parts of the hand may indicate the site of the bleeding vessels. In one case the oozing of blood was taking place from the roof of the vagina and in another from near the *os uteri*.

Treatment.—Once the actual nature of the condition causing the hæmorrhage was recognised the treatment proved simple and effective. All blood clot was removed and a solution of alum, of the strength of one in forty of water was injected into the vagina through a soft rubber tube, and the treatment repeated every other day. Three injections were generally sufficient. The mare should be kept at rest during treatment, and not worked for a week or ten days after cessation of the flow.

Discussion.—This form of hæmorrhage seems peculiar to mares, and is in all probability determined by the special anatomical features and disposition of the vaginal mucous membrane, necessitated by the unusual nature of the acts of parturition (the latter being a galloping one) and coition, in this animal; since in both instances allowance has to be made for sudden ballooning and distension. The membrane is disposed in longitudinal folds which are especially well developed around the os; it is but loosely attached to the underlying tissues and in certain mares the condition tends to become exaggerated. The vessels in the folds, having little or no support, rupture and oozing take place, the escaped blood collecting in the well of the vagina, to be periodically expelled, particularly after urination.

The extraordinary distensibility of the vaginal walls in the female equine was recently evidenced by a mare delivering herself in a few minutes, without assistance, of a live foal, in which the presentation was a thigh and croup one. A cow would probably take some hours to deliver herself in a similar presentation.

Similarly the free nature of the membrane readily allows of the vagina taking on the function of the bladder in acting as a reservoir for the urine in long-standing cases of inversion and prolapse of the latter organ.

According to Fleming's "Veterinary Obstetrics" (Craig), the vaginal folds if existing in the cow are transverse. In the latter animal prolapse of the vagina is common, while in the mare with her loose longitudinal folds it is rare, and I have only seen it with her during an attack of colic at almost full term and during periods of straining. The cow tolerates exposure of the vaginal mucosa well; in the mare necrosis would quickly follow any such condition and it rarely occurs. Another feature of the vaginal mucous membrane in mares is the readiness with which adhesions follow difficult parturition, and it is probably good practice to examine cases, in which there has been much interference, at the end of a month so that any adhesions present may be broken down. In one case the union between the walls of the vagina brought about a condition in the mare just like the so-called "White Heifer Disease."

ON THE COMPARATIVE TENDENCY TO INVERSION OF THE UTERUS AND ITS HORNS IN THE MARE AND COW.

Terms.—In veterinary obstetrics the terms "inversion" and "prolapse," as applied to the womb, are used interchangeably, but in midwifery the term "inversion of the womb" means that the organ (or part) is turned inside out and bulges into the vagina like a tumour, and when the parts appear outside the vulva the condition is said to be one of prolapse. This seems to me the better usage and is here adopted.

A study of the comparative differences concerning the physiology and pathology of parturition and the accidents and diseases incidental thereto is an interesting and important one for the veterinary practitioner. The principal point under discussion in this article is the remarkable ease with which inversion or invagination of the horns of the uterus may be brought about in mares during attempts at removal of retained membranes, and the rarity with which this form of displacement occurs in carrying out the same procedure in cows, at least in the experience of the writer. At first sight this statement would seem quite contrary to the general experience as to what actually happens, judging from the frequency with which one meets with cases of prolapse of the uterus in cows and the rarity with which we see it in mares.

The difference is, however, more apparent than real, since the cows in a district so greatly outnumber the mares; and, moreover, cases occur in mares which are never seen by the practitioner at all, since death in some instances takes place so quickly after the prolapse of the organ that the mare is dead or dying when the accident is discovered, for while a cow or ewe may live with the uterus outside for a considerable period, it is only exceptionally that a mare lives many hours in a similar state, notable exceptions being met with from time to time.

A study of the mechanism of the induction of inversion and prolapse in the mare and cow respectively serves to explain, however, why the accident is actually more common in the latter, especially prolapse. The causes which bring about inversion in the cow are not as a rule those operating in the mare, and *vice versa*. In the mare, displacement invariably would seem to begin with the horn of the uterus, and is determined by a pull on the membrane still attached to the horn, foaling in the standing position, or with a tough and short umbilical cord, and the mare getting up after foaling with the cord unbroken and the placenta still attached to the horn, or the mare may be stepping with a hind foot on the protruding membranes in the act of rising, and thus the uterus is pulled out, or sufficiently inverted to permit of straining bringing about prolapse. In the cow the part of the uterus which as a rule is the first to be prolapsed is the os. The body of the uterus is carried backwards, taking the horns along with it. When the backward movement of the uterus becomes arrested any pressure from in front, induced by straining, will readily turn the whole thing inside out.

Inversion of the horns without displacement of the body of the uterus is rather a rare condition to be met with in the cow, when one is called in to a case of retained membranes, and I have encountered the condition in about an equal number of cases in mares and cows. It is remarkable that, while prolapse of the uterus in the mare is so fatal, an accident, inversion of a horn would seem to involve little danger to life provided the condition be recognised and dealt with in time. No case of inversion of the horn of the uterus in mares has so far ended unfavourably, and reposition has been easy except in one case, where it was impossible to reduce it and the cauliflower-like enlargement was left as found. Nothing happened, however, and the mare carried a foal the following year.

It has been surprising how easy it has proved in many instances to start inversion of the horn in mares when the placenta has been attached well forward, and no traction should ever be employed until a hand is used to support the uterus, and to separate the membrane at the point of attachment. In removing the afterbirth in cows the point of greatest difficulty is the detachment of the most anterior cotyledons in the horn, and although a considerable degree of traction has been tried purposely on numerous occasions, in no single instance has inversion of the horn ever occurred. In fact, in the cow there would seem to be no special tendency to inversion of the uterus until a backward displacement of the entire organ had previously taken place, and then it readily occurred; while in the mare this special tendency did exist apart from any displacement of the body or posterior segment of the organ; but this tendency is more than counterbalanced by the facility with which the chorionic membranes become detached from the uterus in the great majority of cases. The essential factor in bringing about prolapse of the uterus in a mare, as already indicated, is a placenta adherent well forward and accidentally or carelessly pulled on during or after parturition, intrinsic causes playing a minor rôle. In the cow the etiology is complex, involving relaxation of pelvic ligaments; relaxation and prolapse of the vaginal wall; insufficiently dilated os and premature drawing of the calf, or gigantism of the latter, and practically all involve backward movement of the body of the uterus, a condition not met with in the mare.

ANOPLOCEPHALA MAGNA (ABILDGAARD) = *A. PLICATA* (ZEDER) FROM A HORSE IN WALES.

By A. W. NOEL PILLERS, F.R.C.V.S.
(*Liverpool.*)

In April of this year I received from Major C. A. Murray, R.A.V.C., officer commanding the Veterinary Hospital at Prees Heath, Salop, a bottle containing several specimens of the above species. They were taken by him from an army mare, and the history of the case was as follows:—She was an American-bred animal of the Percheron type and had been repatriated from France or the Rhine towns of Germany some time after the Armistice. She was allotted to a person at Llantrissant, Glamorganshire, under the Territorial boarding-out scheme. At a periodic inspection she was found to be in poor condition and was consequently sent into hospital for further examination and

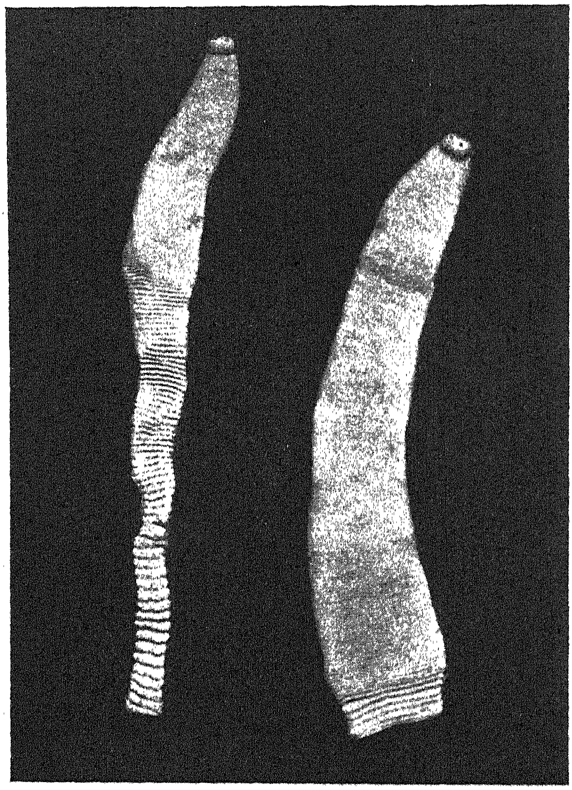

Fig. 1.—*Anoplocephala magna* (slightly reduced).

treatment. Shortly after admission she was taken with severe colic and a twist was diagnosed. After a brief illness she died. Post-mortem examination revealed a twist of the double colon. In the small intestine were 58 specimens of *A. magna ;* most of them were in the jejunum and ileum. Numerous *Ascaris megalocephala* (displaced from their normal habitat) were present in the large bowel. I have not been able to find any recent record of the occurrence of this tapeworm in the United Kingdom, although the allied *A. perfoliata,* a form with lappets, I have encountered in Cornwall, Derby, Leicester, Lincoln and the West Riding.

A. magna has no lappets or lobes projecting from the base of the head. Of the specimens illustrated in Fig. I. that on the left is 10.5 cms. long, and that on the right is 18 mm. broad at its greatest point. It is a very plastic species. Railliet (1) described three varieties, viz., *pediculata*, *restricta*, and *straugulata*. The latter measured 9.5 cms. in length and 18 to 20 mms. at its greatest width. It was the longest of his three varieties and was found in great numbers in anæmic foals by M. Guillod, veterinaire of Etain (Meuse). Large numbers were present in the small bowel from the stomach to colon ; badly affected animals died after showing symptoms of dull colic. The length of the present specimens exceeds that given by Railliet (1), Neumann (2) and myself (3), from specimens from Hanover. Underhill (4) states that it may measure 12 cms., and Law (5) 6 to 30 inches, whilst Cobbold (6) goes so far as to say it "acquires a length of three feet." I do not think that he found it in this country.

Equine tapeworms appear to gradually become less rare as one passes from Western to Eastern Europe, until in Eastern Russia they are often encountered (Neumann). It is possible that in the present case infection occurred abroad, but that point cannot be settled definitely, as we do not know the life history or the duration of life of these worms. Stephens (7) states that certain cestodes of man may attain an age of several or many years (thirty-five).

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SPEWING THE CUD.

By W. R. DAVIS, M.R.C.V.S.,
Enfield.

MOST veterinary surgeons whose practice embraces cattle are familiar with cases in which a cow is found with her manger half full of a greenish, sour-smelling, pultaceous mass; or if the cow is at grass masses of the same material are found here and there on the pasture. The cow is said to be dropping (or spewing) the cud. This malady is usually said to arise from one of two causes:—

(1) Painful affections of the mouth.
(2) Digestive disturbances attributable to decomposing or otherwise irritating foods.

It is also said to have accompanied actinomycosis of the rumen and of the other compartments of the bovine stomach.

Within the past year I have met with several cases of this affection (two on one farm), and I devoted considerable time to watching the last patient. As a result I began to doubt the accuracy of the views generally held as to its etiology and as to the manner in which the material is rejected. I found this cow, a young dairy shorthorn, with the trough half full of the usual greenish matter. I noticed that the left ear drooped and that the left eye appeared to be smaller and more covered by the eyelids than the right. The farmer told me that this cow had been horned several times by another of the herd on the previous day.

As I stood watching my patient she commenced to chew the cud, and as she did so I observed that now and then a quantity of the chewed matter, semi-fluid from abundant saliva, welled out (or, rather, was churned out) from the left side of the mouth and fell into the manger. I watched the cow for half-an-hour, and each time she "cudded" there was the same pushing out of chewed matter. The cow appeared to be losing the greater part of the cud.

It seemed to me that in this case, at any rate, the malady was due to injury to the seventh cranial nerve and consequent paralysis of the cheek. It was not a question of vomiting or dropping the cud out of the mouth from pain; it was a case of sheer inability to retain the half fluid mass in the mouth and swallow it. I was confirmed in this view by the remembrance of what I saw in a foal last year. A mare and foal were turned out in a field with a two-year old gelding, and the latter, wishing to play with the foal, frightened the little creature so that it ran into a gate, through which it pushed its head and received a very severe wound behind and below the left ear on withdrawing the head. There must have been considerable violence, as a piece was chipped off the wing of the atlas. The wound healed after some weeks, but all the time part of the milk, as the foal sucked, poured out of the side of the mouth. In this case the ear drooped, the eye of the affected side appeared smaller, and the nose was twisted to the off side. I lost sight of the foal until last February, when the owner asked me to make an examination and report whether it was worth keeping the colt. I found the animal in very poor condition and stunted in growth. It was eating some crushed oats, and part of the food was churned out at the left side of the mouth. As I was informed that this had been going on all the winter I advised slaughter, which was carried out. I felt sure that this case was parallel with that in the cow described above, and I am convinced that painful affections of the mouth (actinomycosis, diseased teeth, etc.) have little to do with the malady under consideration. A friend informs me that he saw " spewing the cud " follow lightning stroke in a cow, the head and neck being the seat of injury.

CASTRATION OF HORSES BY " MALLING."

By B. DORASMY IYENGAR, G.M.V.C.,
Veterinary Inspector, Karimnagar, Nizam's Dominions, India.

HAVING read an article in your valuable journal for January, 1921, I am induced to describe the process of castration of horses by the Afghan method of malling. I have only once seen an animal being treated that way, by a graduate of the Bombay Veterinary College, whose name I do not want to publish.

Mr. Dalrymple-Hay, in his article referred to, seems to have been informed that the " operation is not a long one," which is wrong, as the case which I saw took a full hour or even more.

I herewith describe the process. The subject, or rather the poor victim of the operation, was a bay country-bred animal, 5 years old and about 14 hands high. He was cast under a tree, on some bedding of paddy-straw. Then all the four legs were tied up together; the animal was then turned on its back and the rope from the legs fastened on to the branch of the tree under which he was lying, the head and tail being held in position by four or five men.

After being cleansed, the two testicles were secured with a string and thus prevented from slipping. The next thing was the malling of the spermatic cords. A soft mass of a mixture of sweet oil and turmeric powder was applied on the cord and the part intended to be " malled." The object of this oil-mixture is to keep the skin lubricated and thus prevent erosions. As one operator got tired, several others followed in rotation and in the end the cord became completely flabby and soft. After this, two pieces of sticks, one on either side of the cord, were placed and tied tightly to both ends, as if the testicles were placed in a vice.

The ropes on the animal were then removed and it was allowed to stand. He was shivering and sweating and not in a position even to keep his balance up. The sticks were loosened after about six hours, and the scrotum was greatly swollen.

The after treatment lasted over a month, and, if my memory is right, there were some complications.

Thus in brief I have described the "malling" operation of horses, and I leave it to your readers to make their own decision on the subject. I for my part consider it a masterpiece of barbarism.

A NEWLY-BORN CALF THAT FASTED FOR TWELVE DAYS.

By W. T. HEWETSON, M.R.C.V.S.,
(Brampton, Carlisle.)

WHAT I am about to relate seems almost incredible, nevertheless it is true. Mr. Fred Headley, Gapshields, Gilsland, Carlisle, had an in-calf Galloway cow, carrying her second calf, grazing on a fell or moorland pasture, three hundred acres in extent, along with two other cows in-calf but not giving any milk, and fifteen young cattle. On Friday morning, July 8, 1921, it was observed the cow had calved, but no calf could be found. She was allowed to remain on the fell pasture for a day, and a strict watch was kept to see if she would find her calf, or go back to the place where she had calved. But she did not show any anxiety for her offspring, nor did she give any clue as to the whereabouts of the calf. On the following day, Saturday, she was removed to the homestead and placed amongst the other milking cows.

For two days the rough fell pasture was searched to find the calf, but it was nowhere to be found. As there was a pond of water on the fell, the search was given up, as it was thought the cow must have calved near this, and the calf in its attempts to rise was supposed to have fallen into the water, and been drowned. On Wednesday morning, July 20, one of Mr. Headley's sons was on the fell shepherding, when he received a surprise. A black calf rose to its feet in front of him, gave a bellow and trotted off a few yards. It was a black heifer calf, and no beauty. Mr. Headley said, " It was the smallest, lightest, most bony calf I ever saw; I took it up into my arms and carried it home."

On arriving home the calf received a tablespoonful of castor oil, and about four o'clock in the afternoon it was given a gill of milk and water—half milk and half water. It was given a tablespoonful of castor oil every day for a few days, as the bowels were constipated, but it scarcely passed anything; and when it had a motion it was very dark-coloured. The calf was fed on milk and water, four times a day. When the bowels became normal the oil was discontinued and a dessert-spoonful of treacle was added to the milk.

The calf is now three weeks' old, and is doing well, though comparatively small in size for its age.

This calf was without food or water for twelve days, and was on the moor night and day. The weather at the time was dry and most of the days were hot.

I could not have thought it was possible for a calf to live so long without food. Yet this calf did, and lived to recover from its long fast. The mother of the calf never suckled a calf; her first calf was reared by hand. This might account somewhat for her apathy to her offspring.

Would the calf have lived if it had suckled its mother once or twice, and then been weaned?

PIROPLASMOSIS OF THE REINDEER.

By FRANK CHAMBERS, F.R.C.V.S., late Major R.A.V.C.,
Wolverhampton.

During the winter of 1918-19, in the course of my military duties in North Russia, I had occasion to enquire into the diseases of reindeer as affecting their utility from a military point of view. Although reindeer have not been greatly used for military transport work, yet discussions with Russian experts and Russian veterinarians who have lived in the Arctic regions for many years have been of intense interest. There are quite a number of diseases which are peculiar to reindeer, but to meet with piroplasmosis so far north was somewhat of a surprise. It appears that M. Kertzelli was the first to draw attention to a fatal disease amongst reindeer known by the Samoyeds as spleen disease. He was successful in discovering a piroplasm which he called the Piroplasma Tarandi Rhangferis.

The symptoms of the disease are somewhat obscure, as apparently it is not the custom of Russian veterinary officers to travel amongst the Samoyeds in the summer, and all the work is done in the winter when travelling can be undertaken in comfort. Although it is well known that spleen disease only exists in summer, yet no Russian has taken the trouble (since Kertzelli made his original expedition) to travel to the Tundra and see the disease. For description of the symptoms they all appear to rely on the word of the Samoyeds—a most unintelligent and absolutely uneducated people.

Eckert published an article in the " Archive Veterinarich Navok," Vol. 3, 1909, on diseases of reindeer, and in connection with the symptoms of spleen disease he writes :—

" Spleen disease attacks almost exclusively only working bulls or driving deer, especially those of them who have not been working for some time and have had the benefit of plenty of food. The moment when they are attacked by this disease is when these animals are called upon to do heavy work, running long distances, or pulling heavy loads in sleighs. The animal attacked suddenly stops in the road, commences to shake, as though from severe giddiness, and falls to the earth in the harness. If we examine the animal at this moment we are most struck by the paleness of all visible mucous membranes. It sometimes occurs that a stricken animal dies at once ; others, however, if they are liberated from their harness and allowed to remain quiet, soon get on their feet and gradually recover from the sickness which thus appears to have been only a ' fit.' Finally, some deer which appear to have recovered, when forced to move again, are attacked a second and a third time and die in one of these attacks.

" Recoveries from secondary attacks of this disease are very seldom seen. An examination of a dead deer, according to the evidence of the Samoyeds, give the following results. Besides the above-mentioned paleness of the mucous membranes, sometimes the peritoneal lining of the abdomen takes on a yellowish green colour whereas the blood-forming organs of the abdomen, especially the spleen, a mass of blood collects. The spleen is much enlarged, becoming several times as large as the normal. The liver is also filled with blood. As to information regarding other parts of the body we were unable to get reliable evidence. The pathological condition of the spleen cannot be regarded as symptomic or a temporary phase of the disease as Samoyeds who know this disease well emphatically state that in the case of deer which have entirely recovered from this illness and have been examined several months afterwards, were found with this organ very considerably enlarged.

" The same applies to the icteric condition of the membranes which remains for a considerable time after the animal has recovered. In the majority of cases, deer which have suffered from this disease do not fully recover. The animal remains for a long time weak and thin, in consequence of which it is generally killed by the owner. The mortality amongst bad cases of this disease is 50 per cent., but in the ordinary way it is slightly less. The Samoyeds think that the cause of the disease is due to eating certain grasses which grow in the most marshy parts of the Tundra, but it must be noted that in other parts the disease is met with also."

The above description does not throw much light on the subject.

Kertzelli in the summer of 1909 made an expedition into the Tundra of the Arctic and did better work. His results were published by the Ministry of the Interior in the form of a pamphlet. A translation of this pamphlet is given herewith :—

SPLEEN DISEASE : PIROPLASMOSIS OF REINDEER.

By Sergius Kertzelli.

" Amongst the reindeer is found a special disease called by the natives spleen disease.

" This disease appears chiefly in the second half of the summer. There is not the slightest doubt of the fact that in the very great majority of cases the owners do not notice that the animal is sick. This disease is only noticed when the animal is made to work—harnessed into a sleigh—then its great weakness becomes evident. On examination of a sick animal one notices a most surprising paleness of the mucous membrane and a sharply defined enlargement of the spleen. When using the thermometer the temperature is not higher than 39 degrees Centigrade. There was no blood stained urine.

" *Post-Mortem.*—One is struck by the weak coagulating property of the blood, its unusually pale colour and great wateriness. The blood gives the impression of slightly tinted water. All the muscles are very pale and flabby. In the chest I sometimes found a small quantity of bloody exudate. The serous membranes are unusually pale. The liver is of a yellowish colour, slightly enlarged and flabby. The spleen is of greyish red, rather hard and very much enlarged. In one case I found a spleen 30 cms. long ; 23-25 cms. wide ; and 9 cms. thick. (Normal spleen of reindeer :—23-25 cms. long ; 15-17 cms. wide ; 3-4 cms. thick). The kidneys are pale, and the lungs are greyish pink. From the cut surface there exudes a considerable quantity of slightly frothy pinkish liquid. Hæmorrhages I did not notice anywhere. The lymphatic glands of the abdomen and chest are considerably enlarged, and many of them flabby. The disgusting condition in which I lived prevented me from undertaking even a superficial examination of the blood, and in the Tundra I had to satisfy myself with the discovery of some sort of a blood parasite in the erythrocytes, after which I employed myself solely to the preparation of smears. For this purpose blood was taken from the ear of a living deer, whilst from dead and cut bodies it was taken from large and small vessels, the heart, and the spleen. To my sorrow, a number of these smears that I made were lost at the Tundra. In crossing a stream my sleigh overturned and a box containing about fifty smears sank to the bottom. I was, however, enabled to bring a number home in safety. As I was forced to prepare these smears under far from laboratory conditions, many of the preparations turned out to be dirty, and I was unable to utilise them. The well-preserved smears were fixed in absolute alcohol for one-half to three-quarters of an hour. The staining of the fixed preparations was continued for half-an-hour with a solution of ciemsa. The results of examination of preparations which were suitable showed us the following. In red blood cells we find included a parasite which has the character of a single-celled organism. The piece of protoplasm which takes a blue colour, very intense on the periphery and slight in the centre, and a nucleus, a chromatic body, which takes a dark ruby colour with a violet shade. The nucleus of these organisms always occupies an eccentric position on the periphery or at the end of these inclusions. These inclusions found are generally in the middle of the red blood corpuscle. They are seldom found on the edge. I did not see a single instance of their being on the periphery of the corpuscle, from the outside. The size of the parasites varies from half to one and a half to two microns. These parasites are found in the red blood corpuscles generally single, more seldom in pairs, and very seldom in threes. Examining the morphological signs of these inclusions the following three groups can, without difficulty, be seen :—

" 1. Comparatively rarely in the red blood corpuscles we meet red-shaped parasites to the size of half a micron, sometimes straight ; sometimes bent occurring either singly or in pairs ; sometimes almost parallel to one another, at different angles, sometimes crossed in the form of an X. On one end of these formations is a nucleus in the form of a spot sharply painted out in a ruby red colour with a violet shade. The rod itself takes on an unequal bluish colour. This group of formations we will call the stick-shaped group, and analogous with the piroplasmata of horned cattle the young evolutionary form of the found parasite.

"2. The second, which is quite often met with, is a spherical shaped parasite, and, comparing the different sizes of it, we may gather that the smallest of the spherical parasites are formed out of the stick-shaped ones. According as these protoplasm collect, these very small spherical formations considerably increase in size, growing to one and a half to two microns. The protoplasm of these parasites on the periphery are strongly coloured, forming in one part a considerably increased thickness in which is found the nucleus of the parasite, and which takes on a ruby red colour. The nucleus of these formations is found either in the form of a grain (seed), or in the form of a bent compact rod placed on the periphery of the parasite.

"3. The third group is very seldom met with and is a typically pear-shaped form. The protoplasm of these pear-shaped formations, both at the thin and thick ends, is deeply stained, while in the centre the staining is considerably less In the thickened edges of these pear-shaped formations is found a nucleus in the form of a grain or in the form of a bent stick. These pear-shaped bodies are not met with singly, in pairs only as a possibility. Not doubting that in this case I am dealing with a single-celled organism living parasitically in the red blood corpuscle, by virtue of the third group of parasites that I have described and by analogy with the piroplasmata of our domestic cattle, I will permit myself to group them with the piroplasmata and will call them a new type of the piroplasma of the reindeer. (Piroplasma tarandi Rhangferis). Without pre-deciding the question of the evolution of the parasite in the blood of sick animals, I will only permit myself to note the following.

"The lengthened nucleus of the parasite divides into two grains. Into the further process of division is drawn also the protoplasm of the parasite and the result is two new parasites of a round or slightly drawn-out form. Thus it cannot be doubted that the parasite may increase in the blood by means of simple division. I was unable to discover any further period of increase of parasites for lack of preparations. The parasite is chiefly met with in the single form, more seldom in pairs, and very seldom in threes. Two small spherical parasites two large ones, a large spherically-shaped one, including a stick-shaped one, three small spherically-shaped ones, a pear-shaped one, with a small spherical one and so on.

"Examining thick smears of blood it is easy to make sure that the red blood corpuscles have not lost the power of piling themselves up (Roulés). When studying the change of the morphological elements of the blood I was able to note a considerable decrease in the number of the red blood corpuscles, and at the same time that both their form and size varied, plainly standing out in a very great quantity of large formations, which are almost twice as large as a normal red blood corpuscle, with blue spots on a pinkish ground. (No doubt a condition of Basophilia.—F. C.)

"On counting up I find almost 10 per cent. of these bodies. In one preparation I found a blue-spotted cell which contained a nucleus stained violet colour. Occasionally I found erythroblasts—very large red corpuscles with a large oval nucleus plainly standing out on a pink ground. I was able to find, in inconsiderable quantities, chromatophiles. As regards the white blood corpuscles I only allow myself at present to note a considerable increase in polymorphonuclear and esoniphoils. After a cursory examination of sections from the spleen of a killed reindeer I was able to discover considerable hyperplasia of the forming elements—an increase in the connective tissues and a considerable collection of brown pigment. In sections from the lymphatic glands I discovered in some parts hyperplasia of the forming elements, and, in others, a process of atrophy so far advanced that there remained in some places almost only one stroma of the gland, with an inconsiderable quantity of the forming elements, a large number of which were in different stages of necrosis."

I have not yet seen a case of this disease and it is very unlikely that I shall, for an expedition into the Tundra during the summer is for me impossible, but I have had a large number of smears placed at my disposal. In two of the smears examined (both from different animals) I observed a pure infection of an organism which resembles the Anaplasma Marjinale. A large percentage of the parasites were placed just within the periphery of the red blood cells. There was no sign of anæmia in either of the slides. Some of the slides showed an infection with a parasite resembling very closely the piroplasma mutans, but the infections were never pure. There were always a number of anaplasma present. The striking fact is that none of the slides, save one, showed any of the classical phenomena of anæmia. The one exception showed a slight basophilia. I did not observe any organism which resembled in any degree the babesia bigeminum, although Kertzell claims to have seen them.

No attempt seems to have been made at experimental transmission, and no mention is made of the transmitting agent. It is quite possible, as in other forms of piroplasmosis, that reindeer require a certain amount of immunity through getting infected when young, and it is probable that the cases of spleen disease are merely breakdowns in the immunity caused by another disease. I have questioned the local reindeer "experts," but none seem to know what is the transmitting agent. None of these have seen a tick in the regions of the Tundra. This is to be expected, for these investigators only make their trips when the country is snow and ice-bound, and one would not expect to find ticks then. When on the Kola Peninsula in June I was struck by the enormous number and variety of biting flies (especially tabinadæ) that existed there. What they live on in these regions is a puzzle, for in my travels I saw no living thing. All the flies that I caught were absolutely empty and, judging from their ferocity and determination to counter attack when repulsed, they must have been exceedingly hungry.

It may be possible that these tabanidæ transmit the disease mechanically, as they do the trypanosomiasis in the Sesheke area in Southern Rhodesia, but I am much inclined to believe that a tick is the transmitting agent, and, if looked for, could be found.

THE FORMALDEHYDE TREATMENT OF MASTITIS.

By LESLIE P. PUGH, B.Sc., F.R.C.V.S.,
Sevenoaks.

I HAVE used half-ounce doses of formaldehyde, twice daily, over a period of ten days, in twenty-three cases of streptococcic mastitis, and in no case was I able to observe any undue beneficial effect that could be definitely ascribed to the internal medicaments. I should very much like to hear the results obtained by other veterinary surgeons who have followed up this line of treatment for this troublesome ailment, which appears to be increasing in frequency. I had been led to try this remedy after reading the abstract in the VETERINARY JOURNAL of a report (originally published in the journal of the American Medical Association) by S. Frost of a number of cases of mastitis treated by its internal administration.

Abstracts.

THE OPHTHALMIC TUBERCULIN TEST.*

BY A. J. DEFOSSET,
(*Montpelier, Vermont.*)

THE complete eradication of tuberculosis from some herds of cattle in the Eastern States would seem almost a hopeless task were it not for the efficacy of the ophthalmic test. Remarkable progress has been made in Fermont in the control and eradication of the disease, in that many herds have been brought under State and Federal supervision. The dairyman and the breeder have confidence in our methods, and the fundamentals of control rest entirely with their hearty co-operation. Each has become thoroughly familiar with the difficulty of our task and is looking forward as eagerly toward a clean herd as he is to an accredited herd. To many of these men a clean herd means one in which each member is capable of passing an ophthalmic check test.

A large number of reactors have been removed from herds under supervision during the past two years by the use of the subcutaneous method, and many herds have apparently been rid from every trace of disease by this method. There are, however, some herds in which infection continues to persist, even after these herds have succeeded in passing one or more clean tests by the subcutaneous method. Some of these cases have become so conspicuous in certain localities that herd owners demand the ophthalmic check test to detect diseased members. These check tests have been applied with great success.

WHAT HERDS SHOULD BE CHECK TESTED?

It is not always possible to determine by herd history which herds should receive check tests. I have learned from experience and careful study that all pure-bred herds in the New England States should be check tested with the ophthalmic method before being placed upon the accredited herd register.

Animals in certain grade herds which have repeatedly changed ownership also should receive ophthalmic check tests. We no longer deny that an animal may become completely immunised against the action of subcutaneous tuberculin, due perhaps to the frequent use of small doses and other faulty practices. Many of us can readily see how whole herds can become immunised against subcutaneous tuberculin when we reflect for a moment and recall what constituted a tuberculin test but a few years ago—short hour tests and small dosage. And we need not mention the activity of the unscrupulous dealer and his familiarity with the hypodermic syringe. Also I have found certain young animals which apparently possess a natural immunity to subcutaneous tuberculin. Cases have come to my attention where young animals which had never received tuberculin failed absolutely to react to the subcutaneous method, even though large doses were used, and responded violently to the ophthalmic method and on autopsy were found to contain well-marked lesions of disease. These cases and others which have become immunised will respond to the ophthalmic method when properly treated.

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*Presented before the Vermont Veterinary Medical Association, Burlington, Vermont.

RESULTS OF OPHTHALMIC CHECK TESTS.

There have been check tested recently in Vermont by the ophthalmic method 50 herds of pure-bred cattle, representing practically all breeds, and the results have been most astounding. Had the ophthalmic test not been employed there would have remained in these herds 223 diseased cattle, and a number of these herds would have been listed on the free list. Can you conceive of us eradicating tuberculosis unless we look carefully into each case to determine what method of test is required?

These ophthalmic reactors were all slaughtered and showed unmistakable evidence of tuberculosis. Some of the lesions were very slight, some well marked, others extensive and generalised. Some were of a caseous character, while others were caseocalcareous. Acute lesions also are found. In short, all stages of the disease and character of lesions are present on autopsy.

TREATMENT FOR THE OPHTHALMIC TEST.

These cases cannot be detected by the ophthalmic method unless the animals are properly prepared for treatment, which should be done by instilling ophthalmic tuberculin in one eye about 72 hours before giving the regular test dosage. This preparatory process is known as sensitisation. For making the ophthalmic test I would recommend the special disc prepared by the United States Bureau of Animal Industry. There are tablets on the market prepared by the commercial firms which also are satisfactory.

HOW THE TEST SHOULD BE MADE.

It is most convenient for a right-handed man to treat the left eye of an animal, and we have for this reason chosen the left eye for the test, and for uniformity in work it is necessary that a certain system be followed. An attendant should hold the head of the animal, which is not difficult to do and needs no special restraint, while the operator stands in front of the subject and raises the upper lid of the left eye by grasping it gently with the left forefinger and thumb. The tablet, which is held between the right forefinger and thumb, should be pushed up under the external lateral lid into the conjunctive fornix. After a little experience a deft and skilful operator can do this without injury or pain to the animal. When the tablet has been placed in position the fingers of the left hand should be released from the upper lid and brought down over both lids, holding them together firmly yet gently so as not to injure the eye until the tablet has dissolved in the closed conjunctival sac which has been forced by bringing the lids in apposition with each other. Great care must be taken that the tablet is not worked out of the eye before it had has time to dissolve.

The tablet should not be placed into the inner angle of the eye because the proper tissue structure cannot be treated there, also the membrana nictitans, whose function it is to remove foreign bodies, would remove much of the tuberculin before proper treatment has been effected. The tuberculin should be placed into the upper fornix of the lateral angle because that portion of the conjuctiva is covered with stratified cylindrical epithelium containing goblet cells and tubular glands. These cells and glands are capable of secreting mucin when reacting to the toxins in the tuberculin.

The criterion of a reaction is a mucopurulent exudate in more or less profusion. We cannot expect a reaction unless we apply the treatment to tissue capable of reacting. A reaction will usually be preceded by slight redness and lacrimation. A reaction usually does not follow the application of the first tablet, which is employed as the sensitising agent. The best results follow the application of the second tablet, which should be given about 72 hours later. It is not well to hasten the time of sensitisation, because the reaction may in some cases be very slight and tend to cause confusion. The best results may be obtained in from three to five days' sensitisation. The ophthalmic test should never be concluded by the application of only one treatment. Very careful sensitisation is absolutely essential if one would expect satisfactory results. If either the sensitisation or the subsequent treatment is carelessly or improperly applied one may note a faint mucous discharge at the inner canthus, which may appear as a little wavy thread, and it is difficult to make an accurate diagnosis and differentiate between the mucopurulent exudate of a tuberculous reaction and a slight mucous discharge commonly seen in normal eyes following the introduction of some foreign substance. A man who would make a successful ophthalmic tuberculin test must be a student of the test and very observing of what takes place after treatment has been placed into the eye.

Observation should be made if possible in about 10 hours after the first tablet has been introduced, and a note should be made of any changes observed and any deviation from the normal or control right eye, using the proper characters for future reference. After the introduction of the subsequent treatment, observations should be made at hourly intervals or oftener, beginning not later than three hours after the installation of the tablet. Some reactions take place within two hours after the second treatment has been applied. If the treatment has been properly applied, the reactions will be clear and well defined, manifesting themselves first by lacrimation, slight redness of conjunctiva, photophobia, and a free discharge of mucopurulent exudate.

If there is a tendency of the reaction being somewhat retarded or ill-defined, an additional tablet may be given five hours after the second tablet, and this ofttimes tends to give conclusive results if the animal is tuberculous. If there still remains some doubt as to a positive reaction, the animal may be retested within one week by using two tablets without previously sensitising. Most eyes remain sensitised a week or longer after the subsequent treatment. Very young animals or calves very frequently will give a reaction to one treatment of ophthalmic tuberculin.

I recommend the tablet form of tuberculin because of the ease with which it can be placed in the proper tissue structures. Only fresh discs which dissolve readily should be employed.

HOW TESTS SHOULD BE RECORDED.

It is necessary that we adopt the use of some character so that the degree of reaction can be noted as one would note the degree in a thermic reaction. Inasmuch as certain changes take place in the treated eye during reaction, a note for future reference should be made of these changes. These notes should be in such form that they may be recorded on a chart as one would the numerals in thermic reaction. The notations should be made in the order in which the change becomes manifest. For instance, if lacrimation is observed two hours after treatment, the letter L should be placed in that column. If exudation follows next, then the next column should show LX, and so on. The degree of exudation may be noted from X, meaning slight, to XX, well marked, and XXX, very extensive or copious exudation. When only a trace of exudation is observed, it may be noted by writing ¼ or ½X. A positive reaction may be LX or LXXX of varying degree, depending also upon the character of exudation. Hyperemia or redness may be noted by H.

As the ophthalmic test becomes officially recognised there will undoubtedly be issued some instructions for adopting a uniform character or code for recording the reactions.

SOME NECESSARY PRECAUTIONS.

1. Don't treat abnormal eyes or a herd when sore eyes are prevalent.
2. Don't try to make an ophthalmic test in a barn or corral where the wind is sweeping through and blowing dust, cinders or other foreign matter.
3. Don't manipulate the eye of the subject unnecessarily and cause irritation from natural results.
4. Don't try to put tablets into the eyes of animals before you pare your finger nails carefully and cleanse the hands.
5. Don't use irritating chemicals on your hands.
6. Don't try to see something in the eye that isn't present.
7. Don't let the owner feel that you have no confidence in your work.—*Journal of the American Veterinary Medical Association, September*, 1921.

SOME CASES OF ANTHRAX IN MAN AND ANIMALS.

In the September Quarterly Report of Mr. J. Scott-Bowden, F.R.C.V.S., the Chief Veterinary Inspector for the County of Cumberland, there is recorded another instance of the communicability of an animal disease to man. Eighteen suspected cases were reported to the Police during the Quarter, but fortunately only one proved to be Anthrax. Mr. Scott-Bowden states :—" The certified case of Anthrax occurred in the Parish of Ennerdale, causing the death of a bull, two dogs, and nearly the farmer himself; only the immediate diagnosis and prompt surgical measures adopted by his medical practitioner saved his life. Dr. Eaton, of Cleator Moor, reported to the Police that he was of opinion he had a patient (a farmer) suffering from Anthrax. I visited the farm that day, an isolated fell sheep farm, and was informed a bull had been taken suddenly ill some days previous; the owner wishing to save the carcase cut its throat, took it into the barn and dressed it. He had a slight scratch on his arm at the time. The offal was given to the dogs, two of which (one a fox-hound) died, and another was very ill but recovered. The carcase of the bull went to a local butcher, the hide and bones being later disposed of to dealers. I had one of the dogs exhumed, and even in its decomposed state I was of opinion Anthrax was the cause of death. As a result of Police enquiries the hide from the carcase was traced to a tannery in Lancashire. The local veterinary Inspector for Lancashire made a microscopical examination of the hide and certified Anthrax ; this was later confirmed by the Ministry of Agriculture. The farm, the butcher's premises, the tannery, and the bone dealer's premises, have all been placed under the restrictions of the order, contaminated material burned, and the premises disinfected. Dr. Eaton's diagnosis was confirmed by a microscopical examination of the excised, diseased portion of his patient's arm, and his blood also contained anthrax bacilli. I have lately seen the farmer in question looking quite well, but firmly resolved never again to attempt the salving of a carcase of an ailing beast. Would that this man's narrow shave for his life could be a lesson to all stock-owners not to risk their own, and their fellow-men's lives, by "cutting an animal's throat to save its life" regardless of what disease it is suffering from at the time, and who is going to eat it afterwards. It is one more case that proves there should not be an outlet for such carcases, and that only such meat as is killed in a public slaughter-house, and is passed by a veterinary surgeon as fit for human consumption, should be allowed to be sold to the public. So long as you have private slaughter-houses all over the country the inspection of meat cannot be carried out, and tuberculous carcases of meat will also find their way to the consumer."

Personal.

CAPT. HENRY EYTON HORNBY, O.B.E., F.R.C.V.S., D.V.S.M., has been appointed Chief Veterinary Pathologist to the Government of Tanganyika Territory, East Africa, and Capt. John Smith, M.R.C.V.S., D.V.H., Chief Veterinary Officer in Northern Rhodesia. These gentlemen will take up their duties very shortly, and will each be accompanied by the good wishes of many friends in the profession.

CONGRATULATIONS to Professor Guido Finzi, a distinguished Italian veterinarian, who is also an Associate of the Royal College of Veterinary Surgeons, on his appointment as Director of the Veterinary Faculty of the Royal University of Turin. Professor Finzi was well known to many of the R.A.V.C. officers in Italy, and during the war served his country as a veterinary officer, being promoted to the rank of lieutenant colonel as a reward for his distinguished services. His position in the University of Turin is that of Professor of Veterinary Pathology and Bacteriology.

WE regret to notice that the Veterinary Profession in America and Canada has sustained a severe loss by the death of two of its most prominent men, Dr. Wm. Horace Hoskins, and Dr. E. A. A.

Grange. The former was Dean of the New York University Veterinary College and the latter a retired Principal of the Ontario University Veterinary College, Toronto.

Dr. Hoskins was for a number of years the chief editor of the *Journal of Comparative Medicine of Veterinary Archives*, and a well-known contributor to veterinary science. He held the office of President of the the American Veterinary Medical Association from 1893 to 1896 and also held the office of Secretary for several years. It was largely owing to his indefatigable exertions that the position of the veterinarian in the United States Army became that of a commissioned officer.

Dr. Grange was by birth a Londoner, but emigrated early to Canada and graduated at the Ontario Veterinary College in 1873. After holding various professorships in agricultural colleges he was appointed to the Principalship of the Ontario Veterinary College in 1908, a position which he held until failing health compelled him to retire in 1918. His son distinguished himself in the British Air Service during the war.

A VERY enthusiastic assembly of well-wishers foregathered at the Holborn Restaurant on Wednesday evening, October 12, to offer hospitality and farewell good wishes to Professor J. T. Edwards, B.Sc., M.R.C.V.S. and his two colleagues, Capts. S. C. J. Bennett and Hugh Cooper, late R.A.V.C., on their departure to take up positions in the Imperial Laboratory at Muktesar, India. Lt.-Col. T. Dunlop Young, O.B.E., D.V.S.M., occupied the chair, and the warmth of the good wishes expressed in the speeches which followed the dinner showed the high esteem in which the above-named three gentlemen are held by their veterinary colleagues. Our wish is that they may enjoy good health and return at some future date laden with honours as the result of the hard work they will have to expend in investigating the countless contagious diseases which are to be met with amongst the animals of the East.

Reviews.

VETERINARY HYGIENE. By R. E. LINTON, M.R.C.V.S., Professor of Hygiene, Royal (Dick) Veterinary College, Edinburgh. Pp. 429; 92 illustrations. Published by W. Green & Son, Edinburgh. Price 26s. net.

VETERINARY hygiene has for some years taken its proper place in the course of studies of the veterinary surgeon, and is daily assuming more importance on account of its close relationship to prophylactic work; as it of necessity follows that before a student can properly understand the symptoms of disease he must of necessity understand the appearance and normal habits of the animal in health. The practical teaching of this is as essential as the theoretical, and it is in the opportunities for this that our college tuition is wanting. The want of a book like this present one under review has been felt for some years, and Professor Linton is to be congratulated upon the masterly yet simple way in which he has tackled the subject. It is a book which every student will buy, but the chapters on Preventive Medicine and Sanitary Law make it also a book for the practitioner, especially if he is a candidate for the D.V.S.M., D.V.H., or any of the degrees which indicate specialisation in public health work. In the section devoted to Sanitary Law one gets in a concise form all the Acts and legal clauses likely to be of service to the practitioner. In fact, there is something of practical service and utility to every branch of veterinary science, and no veterinary bookshelf is complete without it.

THE ARMY VETERINARY SERVICE IN WAR. By MAJOR-GENERAL SIR JOHN MOORE, K.C.M.G., C.B., F.R.C.V.S., Director of Veterinary Services in India and late D.G. of the British Expeditionary Force, France (1914-19), with a note by GENERAL SIR CHARLES CARMICHAEL MONRO, G.C.B., G.C.S.I., G.C.M.G., A.D.C., Commander-in-Chief in India. Pp. 191; illustrated. Published by H. & W. Brown, 20, Fulham Road, S.W. Price 21s.

THE proceeds of the sale of this book, after the cost of publication has been deducted, are to be devoted to the foundation of a benevolent fund for the personnel of the R.A.V.C. in India, and the personality and popularity of the author ought to make that aim and object one which will receive sufficient support to get the scheme in hand at once. The book, on the centre of the cover of which is the familiar sign of the R.A.V.C., the white triangle on a red background, is divided into six portions, and to read it will bring back to all who served under the author all the many and various problems which had to be solved under conditions of great stress and difficulty. The wastage of animal life, the steps taken to prevent this, and the ultimate successful sequel, are all engraved deeply in the minds of those who were privileged to serve and see the game played through from start to finish.

Comparisons between the horse management of the armies of the Allies and that of the Central Powers show up the Britisher in the front rank every time, and the Royal Army Veterinary Corps can, without being accused of boasting, claim to have been right in the vanguard in this matter.

The losses due to errors of dieting, to the continual standing in the mud, to foot cases (especially the ubiquitous picked-up nail), to glanders, epizootic lymphangitis, and a hundred and one other causes which war produces—all are described and figured in this book, and the methods by which they were tackled and vanquished will form a groundwork for all future wars. War time in all countries is dealt with, and India and the East, with its camels and different varieties of oxen, come in for their share of discussion.

No one serving in the R.A.V.C. can afford to be without it, and to the civilian practitioner it forms a never-failing source of interest, both as regards the text and the illustrations, the latter being reproductions from actual photographs.

General Sir John Moore has done the profession a great service by his labour of love, and it is to be hoped that his object, to found a benevolent fund with the profits of the book for the R.A.V.C. in India, will be attained.

PIGS, PIGSTIES, AND PORK. By G. MAYALL, M.R.C.V.S. Pp. 227; 63 illustrations. Second Edition; revised and enlarged. Price 10s. 6d. net. Published by Baillière, Tindall & Cox, London.

Mr. Mayall, when bringing out the first edition of this little work, filled up a long-felt want, for the diseases of the pig had been neglected and the proper feeding and general hygiene of the animal were also not properly understood. This book, written in simple but practical, language, is of interest to the pig owner as well as to the veterinarian, and as a text-book for the college student it is *par excellence* the best one which has ever been published.

The various breeds are indicated and described, the method of telling the age, the management of the sow during parturition, the rearing and weaning of the piglings, the construction of pigsties, the methods of slaughter and the curing of the flesh, all have chapters on them well and clearly written; whilst all the most important diseases are touched upon and described.

It is a book equally of use to the student and the practitioner, and should find its place in every stock-owner's and veterinarian's library.

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(1) A MANUAL OF VETERINARY PHYSIOLOGY. By MAJOR-GENERAL SIR F. SMITH, K.C.M.G., C.B., Fellow and Hon. Associate of the Royal College of Veterinary Surgeons, formerly Director-General of the Army Veterinary Service. Fifth Edition. London: 1921. Baillière, Tindall & Cox.

(2) ESSENTIALS OF VETERINARY PHYSIOLOGY. By D. NOEL PATON, M.D., B.Sc., LL.D., F.R.S., Professor of Physiology, University, Glasgow; late Lecturer in Physiology, Royal (Dick) Veterinary College, Edinburgh, and JOHN BOYD ORR, D.S.O., M.C., M.A., M.D., D.Sc., Director, Rowett Institute for Research in Animal Nutrition, Aberdeen; Research Lecturer on Physiology of Nutrition, University, Aberdeen. Third Edition. Edinburgh: 1920. W. GREEN & SON.

WE have here two books of similar title, but of different type. The first, by an eminent veterinarian, deals chiefly with the physiology of the organism and more particularly with that of the horse. The second, by eminent physiologists, is especially devoted to the functions of the tissues and organs.

In his treatment of the latter details, Sir Frederick Smith leaves much to be desired—notably in chemistry. Prof. Paton and Dr. Orr are conspicuously successful in these matters, in spite of the fact that they relegate to an appendix a great deal that is needed in the text. Their terminology and phraseology are, however, so very academic that much otherwise excellent explanation may be hardly intelligible to the practitioner. It is in writing for the physiological layman that

Sir Frederick Smith excels. His descriptions of many of the systems are unusually lucid and illuminating, and cannot fail to be of great value to all his readers.

It would be most difficult—if, indeed, it is possible—for any single author to write a really good text-book on Veterinary Physiology. Those who are familiar with organs and their functions are seldom sufficiently familiar with the daily life of the domestic animals; whilst those in touch with the latter are out of touch with the experimental physics and chemistry of the body. Far greater results could be achieved by wider co-operation.

An introductory volume, on Experimental Physiology, written primarily for the student, but intelligibly to the practitioner, followed by a volume (or by volumes) designed primarily for practitioners, dealing with the different types of animals, would, given judicious division of labour, furnish a work of much higher standard than has yet been reached. Experimental Physiology is not merely a laboratory pastime—it is, in fact, the basis of all Medical Science. More lucid and complete (not more abstruse) presentation of the laboratory aspect, supplemented by more extensive accounts of the special domestic physiology of the individual domestic animals, would do much more to further the study of comparative pathology and the practice of comparative medicine than has hitherto been done by writers on Veterinary Physiology.

There are plenty of books, and some of them possess excellent features. What is lacking is an intelligible, reliable, complete, and co-ordinated system of Veterinary Physiology. W. L. SYMES.

BAILLIÈRE'S ATLAS OF THE DOG: ITS ANATOMY AND PHYSIOLOGY. By FREDERICK HOBDAY, C.M.G., F.R.C.V.S., F.R.S.E., Honorary Veterinary Surgeon to His Majesty the King, Member of the Board of Examiners of the R.C.V.S., and F. HAROLD STAINTON, F.R.C.V.S. With 5 original plates containing 43 figures in colour, by Georges Dupuy, M.D. Price 10s. 6d. net. Publishers: Baillière, Tindall & Cox, 8, Henrietta Street, London, W.C.2.

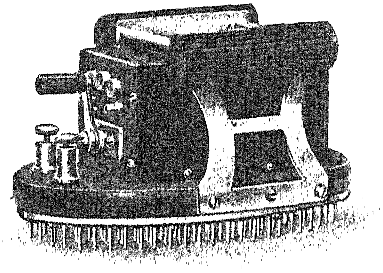
THIS very excellent atlas of the dog is on similar lines to that published by the same firm on the horse. It has hitherto been somewhat of a reproach to us that no real and plain guide to the anatomy and physiology of the dog has been available until now. The dog is taking a big place in veterinary practice, and yet the student and the practitioner have had to do a good deal of fishing, hunting and exploring to learn much about his bodily structure and physiology. No better men to deal with the subject could have been chosen than the authors and illustrator of this atlas, and they have done their work remarkably well.

The plates are beautifully done and quite easy to understand when looked at by the light of the concise yet comprehensive accompanying text. The text itself is in good bold type and readily referred to when the book is opened out on a wide table. To the veterinary student the atlas ought to be a godsend, and no practitioner who desires to be up-to-date in canine knowledge can afford to be without it. The contents comprise plain and concise descriptions of the skeleton, the various systems of the body, dentition, the ductless glands, and organs of sense. G. M.

New Inventions, etc.

A NEW AND SUCCESSFUL METHOD OF APPLYING ELECTRICITY TO VETERINARY PURPOSES BY THE USE OF THE HOGDKINSON SYSTEM, WHICH HAS FOUND MUCH FAVOUR WITH THE MEDICAL PROFESSION, AND IS NOW ADAPTED TO MEET VETERINARY REQUIREMENTS.

THE above is an illustration of the instrument, reduced to half size. It has the merit of being portable, cleanly, and eliminates the necessity for using wet sponges and single electrodes. The electrical energy required to operate the instrument is derived from a single dry cell of ordinary 1·5 volts E.M.F. This is connected with the instrument by a pair of flexible cords. There is no trouble regarding the "polarity," as the current used or applied to the patient is Faradic, and owing to the rapidity of the alternations there is no reaction from the sensory system, and the risk of "shock" is obviated. The technical details are standardised and interchangeable. The collector switch on the rear end of the cover of the coil box is arranged to afford three variations of intensity, thus meeting any reasonable requirements in the matter of "dosage." The contact plates on the foundation are separated by an insulating strip of ebonite, and are fixed. These plates act as conductors, and when in contact with the skin complete the electrical circuit. The result is stimulating to a marked degree, though devoid of any exciting result. Hair or fur are well known bad conductors, because they interpose much resistance, and Mr. Hodgkinson has overcome this difficulty by inserting pine in the plates which, penetrating to the skin, convey the current as in the case of human beings. If allowed to rest upon any locality the effect is accumulative, thus demonstrating that the remedy is being absorbed by the underlying muscles and nerves which it is desired to influence.



THE NATIONAL RAT WEEK.

THE Ministry of Agriculture announces a further National Rat Week to be held during the week October 31 to November 5 next. This provides a definite period during which simultaneous action may be taken throughout the country by all who are aware of the presence of rats on their premises. It is important that the action should be energetic as well as taken by all concerned at the one time. Action at different times and confined to limited areas means a considerable measure of ineffectiveness, as it is found that most of the rats immediately upon commencement of operations leave the area of attack until the cessation of hostilities. A general attack sustained throughout the Rat Week will mean that the pest is being driven "out of the frying-pan into the fire."

The weapons against the rat are several. First in importance and suitability for use by householders and occupiers of premises are the poisons Barium Carbonate and Red Squill (Scilla Maritama), which may be obtained from most chemists, and used in accordance with the following instructions. Mix equal weights of the following ingredients into a thick paste :—Barium Carbonate, oatmeal or bread crumbs, minced kipper, and fat ; or mix into a paste 1 part weight of Barium Carbonate, 2 of oatmeal, 1 of fat, and a few drops of aniseed oil. A teaspoonful of either paste is a sufficient poison for a full-sized rat. The paste should be wrapped in twists of paper and placed in rat-holes and runs.

As regards Red Squill, it can be had from many chemists in the form either of liquid extract or of powder. The liquid form may be used in two ways. (1) Pour just as much liquid Squill on bread placed in a basin as the bread will soak up. Then put the bread in twists of paper and lay at once in rat-holes and runs. (2) Add a measure of sweetened milk and water or thin soup stock to an equal measure of liquid Squill. Put down at once in saucers or shallow pans near the holes or in the runs where domestic animals cannot get at it. The bait should be made and laid in the evening. With regard to Red Squill Powder, it can be prepared in the following way :—(1) 2 parts weight of Red Squill, 5 parts weight of cheese, 5 of fat and 6 of oatmeal or flour ; the whole mixed in a thick paste and baked lightly in an oven. (2) 1 part weight of Red Squill, 2 of bacon dripping, 6 of oatmeal or flour ; make into paste and bake lightly. (3) 1 part weight of Red Squill, 5½ of flour, and 2½ of syrup or sugar ; make into paste with milk and water, roll out and bake as biscuit. The ingredients and final product of these mixtures should be touched as little as possible with the hands.

Over and above these special measures, must be the general one of keeping scraps and waste food out of the vermin's way. They must be starved so that they may take up all the poison bait. Larders must be made proof against their inroads ; dustbins must be securely closed ; chicken feed, dog biscuits, oats, oil-cake and feeding stuffs, apples, potatoes, etc., must be put where the rats cannot get at them.

In connection with this announcement, the public is reminded that, under the Rats and Mice (Destruction) Act, 1919, every occupier of premises is responsible for the destruction of rats and mice thereon. Local Authorities are by the Act made responsible for securing the execution and enforcement of measures for rat destruction within their areas. Requests for advice or assistance should therefore be addressed to the Clerk of the Council for the area in which the occupier resides.

An early notice of the proposed Rat Week is being given so that occupiers may order the necessary stocks of poison with a certainty of getting them in time.—*Ministry of Agriculture and Fisheries, October* 10, 1921.

WORLD'S POULTRY CONGRESS.

ITEMS OF INTEREST TO VETERINARY SURGEONS.

THE first World's Poultry Congress, under the patronage of the Dutch Government, was held at The Hague, Holland, September 5—15, 1921. In connection with the Congress there was given an educational exhibit; including over 2,000 fowls, participated in by the leading poultry investigators, instructors and poultry keepers of more than twenty-five countries, including America, Australia, New Zealand, England, Scotland, Wales, Ireland, Denmark, Holland, Austria, Belgium, France, Portugal, Spain, Switzerland, Italy, Egypt, India, Ceylon, etc.

The Exhibition was formally opened at 2 p.m., September 5, by Queen Wilhelmina and Prince Henry of Holland.

The papers contributed came from poultry scientists from all parts of the world. Owing to the enormous field poultry covers, and the scores of papers to be presented, the meetings were divided into four sections, the third being that of Hygiene and Disease.

The section on disease was presided over by Dr. D. A. De Jong, of the State University of Leyden. Twelve papers were presented by veterinary surgeons specialising in the investigation of poultry diseases. Those contributing papers were Dr. J. Poels, Dr. J. R. Beach, Prof. Dechambre, Dr. D. A. De Jong, Dr. L. De Blieck, Dr. F.

Van Heelsbergen, Dr. B. J. C. Te Heunefe, J.Z.N., Dr. B. F. Kaupp, Dr. H. E. Reeser, Dr. L. F. Rettger, and Dr. Camille Terni.

During the business session of the Congress a resolution was passed recommending that, in all countries where poultry production work is an important industry, the teaching of poultry diseases be efficiently and adequately taught in all agricultural and veterinary colleges. It was pointed out that the veterinarian should know more of the anatomy and physiology of the fowl, and be capable of handling parasitic, non-contagious and contagious diseases of fowls.

A second resolution was passed recommending the continued investigation, in all countries, of contagious diseases among fowls, and to determine if it is advisable and feasible to officially control contagious diseases of fowls, and, if so, which diseases.

B. F. KAUPP.

THE AMERICAN VETERINARY MEDICAL ASSOCIATION.

The American Veterinary Medical Association recently held its fifty-eighth annual meeting in Denver, Colorado. This Association has four thousand members, mostly resident in the United States and Canada, but it also has members in nearly all parts of the world.

Graduates of reputable veterinary colleges are eligible to membership—it is not necessary that they be resident in North America. The initiation fee is $5, and the annual dues are $5 and include a subscription to the excellent official monthly journal of the Association, edited by Dr. J. R. Mohler, Chief of the Bureau of Animal Industry of the United States.

British veterinarians desirous of joining the Association can have all particulars upon application to Dr. N. S. Mayo, 4753, Ravenswood Avenue, Chicago, Ill., U.S.A. The President for this year is Professor Kinsley, of Kansas City, Mo.

ERRATA.—September and October Journals.

September—*Page* 337, line 4, ½-*drachm* should be ½-*ounce*.

October—*Page* 380, twelve lines from bottom of page, "On no account must grass or hay or *any food* be given," should read "On no account must grass or hay or any *dry* food be given."

NOTICES.

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Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editor.

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Illustrations for reproduction should be in good black or dark brown ink on white paper or card.

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THE LATE MR. JOHN BOYD DUNLOP,
Member of the Royal College of Veterinary Surgeons.

THE

VETERINARY JOURNAL

Editor :

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Sub-Editor :

GLADSTONE MAYALL, M.R.C.V.S.

DECEMBER, 1921.

MR. JOHN BOYD DUNLOP, M.R.C.V.S.

ALTHOUGH perhaps better known through his inventive genius, which gave to the world the pneumatic tyre, Mr. John B. Dunlop was in his day well known throughout his profession in the North of Ireland as a successful veterinary surgeon. In fact, he and his partner, Mr. John Ross, who still carries on the practice in Belfast, in partnership now with his enthusiastic colleague, Mr. J. Ewing Johnston, M.B.E., had always a big practice in that busy city, and the room in which Mr. Dunlop did his first experiments can still be shown to those who ask to see it.

A graduate of the Royal (Dick) Veterinary College in 1867, he was always a staunch supporter of all matters which made for progress in the profession, and was a well-known figure at the Irish Veterinary Association meetings. Even so late as the day before he died he was writing an article which he hoped to have the opportunity of presenting before a meeting of the profession.

The invention of the pneumatic tyre, the fact of his son (who predeceased him) being a well-known bicyclist, the ridicule heaped upon the invention at the start, and the well deserved praise and rewards given to its inventor at the finish, have all been described in the public press and are too well known to need repetition here. We as a profession are proud to think that he was one of us, and that he lived to see the unparalleled success of his invention; also that, unlike many inventors, he was able to obtain and enjoy the fruits of his labour.

Editorials.

"AT LAST!!"

Agricultural Research Scholarships and Fellowships.

At last, after many weary years of waiting, a small start has been made by the Ministry of Agriculture and Fisheries towards helping the young graduates of the veterinary profession to obtain facilities for study and research work. It is, it is true, not a tenth part of what ought to be done, nor is the amount given any too great; but it is something, and the thin edge of the wedge which, if driven home properly and taken hold of by the right men, will do a very great deal to stimulate and encourage those who have ability but no pecuniary resources with which to develop it.

Now it will be for those who have obtained the prizes to select a proper laboratory in which to develop their talents to the best advantage for the benefit of the profession, and to prove that they are worthy of the confidence which has been reposed in them. The following is an extract from the weekly journal of the Ministry of Agriculture and Fisheries:—

"The Ministry of Agriculture and Fisheries, on the recommendation of the Advisory Committee on Agricultural Science, and with the approval of the Development Commissioners and the Treasury, have awarded Research Scholarships, of the value of £200 per annum, to the following candidates:—

Mr. A. E. Watkins, B.A., Cambridge (Botany), for two years.
Mr. D. Cuthbertson, B.Sc., Glasgow (Chemistry), for one year.
Mr. R. A. Glover, M.A., B.Sc., Edinburgh (Veterinary Science), for two years.
Mr. T. W. M. Cameron, M.R.C.V.S., Royal Veterinary College (Veterinary Science), for two years.

Travelling Research Fellowships of £250 each have been awarded to:

Mr. B. A. Keen, Soil Physicist at the Rothamsted Experimental Station, for a visit to America in the Autumn of 1921.
Professor R. G. Stapledon, Director of the Aberystwyth Plant Breeding Station, for a visit to America in 1922.

The Agricultural Scholarships are open to graduates with honours in Science of a British University who give evidence of high proficiency in subjects having a direct bearing on agriculture. The Veterinary Scholarships are open to students who have secured the diploma of the Royal College of Veterinary Surgeons. The Scholarships have been established to assist such graduates or students to qualify as research workers with a view to their contributing to the development of agricultural and veterinary research.

Travelling Fellowships were instituted last year to enable selected members of the staffs of research institutes aided by the Ministry to visit institutions abroad where work on similar or cognate subjects is carried on and to study at first hand the methods employed there."—*Ministry of Agriculture and Fisheries.* (Nov. 7, 1921.)

WORK OF THE INDIAN CIVIL VETERINARY DEPARTMENT IN BENGAL.

In a further column we give an expert review by one who knows the country, of the Cattle Census report of the Presidency of Bengal, which illustrates some very important work done by the officials of the Indian Civil Veterinary Department in that province. It shows in pretty conclusive fashion the great difficulties under which these officers work and the valuable results they have accomplished in regard to the controlling of contagious disease and the propaganda of hygienic and prophylactic measures for the health of the herds.

In a country like India, where so many factors are at work, where religious and political differences have to be contended with as well as very severe outbreaks of contagious disease, it is really marvellous when one looks at the results which a comparatively few skilled experts have attained; and one shudders when one thinks of the chaos which would reign were such guiding influences to be withdrawn.

Underpaid, even now with the improved conditions, and always understaffed and overworked, it is with pride that their *confrères* in Great Britain admire the thorough manner in which their colleagues in India fulfil the call of duty in assisting to maintain the health and integrity of the Empire.

A PERMANENT PROPHYLAXIS AGAINST TETANUS.

We recommend our readers to peruse carefully an article in this issue by Mr. J. B. Buxton, F.R.C.V.S., D.V.H., on "The Active Immunisation of Horses Against Tetanus," and to get into touch with the author in order to test fully whether what has proved so great a success in the laboratory animal will be equally satisfactory under natural conditions in the field. Should it prove to be possible to confer a permanent and lasting immunity upon all equine stock it will be the duty of the veterinary practitioner in every tetanus infected district to advise all owners of foals and horses to have their animals inoculated and immunised without delay. Should it prove to be a long-lasting immunity the work done by Mr. Buxton will have conferred a boon upon stock and the stockowners which cannot be over-estimated, and the value of the properly trained veterinarian will again have been demonstrated and vindicated.

General Articles.

RECIPROCITY AND THE CANADIAN CATTLE EMBARGO.

BY MAJOR-GENERAL SIR J. MOORE, K.C.M.G., C.B., F.R.C.V.S.
(*Army Veterinary Service* [*Retd.*].)

THE pronouncement of the Royal Commission on the importation of store cattle has been made, and speculation is rife as to the probable action which will be taken on the reassembling of Parliament. In the meantime opinion is freely expressed in our daily papers and perhaps more particularly those farming, field, and trade periodicals interested in the question.

Two broad lines of opinion are presented: the one showing the views of the producer and prognosticating retrograde effects which the removal of the embargo will have upon the agricultural industry of this country; the other the relief which the measure will afford to the meat trade, and to the consumer in a cheaper meat supply.

The Commissioners have been criticised as being unrepresentative of the true interests of this country in the question, and disappointment in many sections of our British community has been evinced at their conclusions on the evidence taken *pro* and *con*. It is, however, safe to say that the majority of the thinking public have the greatest confidence in that fine, broad-minded, practical man who was chosen as the chairman of the Commission, and in those proved servants of the State who were associated with him in the enquiry.

In common with others whose whole service up to a retired age has been given to the State and whose mission in life has lain specially with animals and the purposes for which they were created and maintained, I have ventured to add to the opinion already expressed on the subject and in a particular direction which has escaped the field of controversy, and was not apparently within the terms of reference of the Commission appointed. For this reason I am prompted to offer a few remarks, a knowledge and experience of animals and conditions affecting them during thirty years of Government service in Canada, the United States of America, British South Africa (including Rhodesia), Australia, Argentine, India, the Continent of Europe and at home perhaps qualifying me to give an opinion.

An argument based on the fear of the introduction of contagious animal disease in support of the continuance of the Embargo cannot possibly stand. Efficient veterinary services of the Board of Agriculture and the Dominion of Canada exist, and their function is to prevent disease and to safeguard the interests of the agricultural communities of both countries. If with our armies at war under circumstances of vast movements predisposing to the spread of animal diseases, situated as they were in France and Belgium in the midst of foot-and-mouth disease in cattle, and exposed to the contagion of glanders and epizootic lymphangitis, we can prevent the introduction of these diseases into the United Kingdom on the return of troops, the prevention and control of disease during the easier times of peace is and must be comparatively easy. At all events the argument may be ruled out.

The contention that the agricultural industry of the United Kingdom will be seriously affected by the importation of store cattle is not clear. A visit to the Smithfield cattle markets discloses the fact that 80 per cent. of the beef there displayed is imported, and taking the whole of the markets or trade of the United Kingdom the consumption of home-fed beef is only 56 per cent., the balance being imported as dead meat. Surely there is room here for increase in the production of the home-fed article. It is quite idle to suppose that the public would prefer to eat meat imported in a frozen state, even if it is cheaper, than home-grown beef in a fresh condition, the true " roast beef of old England," renowned throughout the world. The hard-working miner, the manual labourer demands that his meat should be of the best quality, and his preference for the fresh beef of his own country is quite easy to understand.

It stands to reason, therefore, that if the United Kingdom (not forgetting Ireland, the land of " stores ") cannot furnish the desired number of young animals to grow into beef, they should be obtained from other sources. It is above all things most important that the fresh meat market should be increased ; it is unsatisfactory at 20 per cent. London and 56 per cent. for the whole of the United Kingdom. The importation of store cattle would enhance rather than inhibit agricultural industry generally. A greater number of animals as beef would be raised, and a corresponding stimulus to growth of crops would result. There would be no talk of putting land away to forestry. The competition induced by the importation of stores in itself would be beneficial in production in greater numbers.

It would seem to me, however, that the policy which governs this question should be viewed from an Imperial standpoint, and not with insular vision. It is a pity that the Commission was not instructed to include this aspect of it under the terms of reference, and if it is not too late I venture to suggest that advantage would accrue from discussion in this direction.

No one who has lived in touch with our great Dominions and Dependencies beyond the Seas can help being impressed with the strong, deep, and abiding bond of blood relationship between the Mother Country and the rest of the Empire. The war proved it to the death. It is the duty therefore of the Mother Country to throw away all narrow-minded ideas of policy, and to open out her interests, her enterprises, herself altogether, to those who are bone of her bone and flesh of her flesh, who stood by her in time of peril, and who are ready to do so again when called on. If we are to reap lessons from the late war, one certainly should be an expansion of mind to conform to the vastness of the Empire.

The subject of Canadian store cattle is a small item of that country's concerns, but it reflects the desire of that live pillar of Empire to trade with the Mother Country. Reciprocity between our Dominions and the parent country has always been a burning question in Colonial minds, and to bring it down to the simple parallel of a family circle, it is not difficult to understand. Moreover, when the child is not comfortable in the family circle, it is apt to wander elsewhere. I call to mind the opinions expressed by influential Canadian friends on the subject of Reciprocity when on a mission to Canada in 1904. The mission was occasioned by the necessity for the preparation of a scheme of horse purchase in the event of war ; the intention being to conduct business in Canada, our own colony, instead of in the United States, a foreign (and in war perhaps a neutral) country. Naturally the subject of reciprocity could not escape remark, and it was said that Canada desired reciprocity with the Mother Country in matters of trade generally. If this was not forthcoming it was feared that reciprocal arrangements with her next-door neighbour would result, which would be " the beginning of the end " ; in other words, the interests of the two contiguous countries would so merge into each other that ultimately they would become one whole. Such a picture is quite conceivable.

It is most vital from an Imperial point of view to preserve by every means in our power those relations of Empire which make for prosperity and solidity.

In the matter of our meat supply we fall short of an Imperial standard. It must be a grief to anyone having Imperial interests at heart to note that by far the greatest amount of the imported beef consumed by the people of the United Kingdom comes from countries which have no connection with, or rather do not form part of, the community of nations known as the British Empire. We have only to consult the market columns of our London daily papers to realise that this is too true, and a visit to the Central Markets at Smithfield will confirm it. We also witness at these markets the names of Argentine, American and other providers of beef who do not represent our Colonial interests. The situation in my opinion suggests that Imperial rights should have better recognition, and the present time, with the conclusions of the Commission fresh in our minds, is a favourable one for action. The suggestion carries the subject beyond the mere importation of store cattle and points to the desirability of consideration of custom with Canada in the dead meat trade. Recently a consignment of chilled meat was received in the London market from that country. It was landed fourteen days after being killed at Toronto, and in my opinion it was prime meat. Chilled meat is the nearest approximation to the fresh article, and it requires no explanation to convince the public that if beef can be imported under a chilled process in such good, wholesome condition and in that comparatively quick period of time, it is better than resorting to countries further afield, where a hard freezing process is necessitated. From a market point of view hard frozen meat is not altogether satisfactory to the public, though it may be eminently so to the trade. Unlike fresh fruit or fresh meat, which must be sold within a limited time or perish, hard frozen meat has an indefinite existence in the supply market. If it is not used to-day it can be kept till to-morrow, next week, next month, or next year for the matter of that. The length of time it has been in cold storage necessarily must be variable in accordance with demand or market. The public have no guarantee as to the age of the meat they are asked to consume, for, excepting in the case of Dutch importations (veal and pork chiefly), there is no indication on the labels attached to the carcases which would enlighten the retail trade or consumer as to the date of slaughter, inspection, or laying down to cold storage. It is an aspect of trade which I think the public has just reason to expect should be put on a better basis. It is quite fair and right that the person who pays the piper should have a say in the selection of the tune. I am aware of the report that a side of beef after eighteen years in cold storage was pronounced quite fit for food, and specially good in extractives, but antiques in food savour of the abhorrent, and it goes without saying that the fresher the meat the better it is appreciated by those who have to consume it. If one of our Colonies can help us out in meat in a comparatively fresh state within fourteen days from the date of slaughter, obviously our support should go out to her in preference to that given to countries outside our Empire. It is an outlook of trade that would suit Canada better than even the importation of live store cattle, which at best carry a lower trade value than full-grown meat. At the same time the open door of importation of young stock should be maintained to encourage the greater output of home-fed fresh beef, which is appraised at home beyond all others, and to stimulate the animal-husbandry side of agriculture, the raising of stock in greater numbers, and the continuance of the quality of our herds, for which we are famous. The custom to Canada would correspondingly reflect on her to her advantage, increasing her prospects and facilities for colonisation and for the employment of young Britons whom she desires as settlers. It is earnestly hoped that our British public at home will not forget their fellow Britons beyond the seas, and will not allow vested interests to prejudice their duty of furthering the prosperity of our great Empire.

Clinical.

NOTE ON THE LIMIT OF THE BREEDING AGE OF THE THOROUGHBRED MARE.

By W. A. WOOD, C.B.E., M.A., M.R.C.V.S.
(*School of Agriculture, Cambridge*).

In order to ascertain at about what age the thoroughbred mare ceases to breed, I went carefully through the lists of mares and their produce, contained in the first volume of the General Stud Book. This book covers a period of about one hundred years, commencing shortly after the year 1700 A.D.

For a considerable number of the mares the exact date of birth is not given, in a few cases the exact date of last foaling is not recorded, and some mares are shewn as being exported or dying at an early age.

I was, however, able to find 1,216 mares, the dates of whose birth and last foaling were recorded; of these mares a few are shown as having aborted one or two years after the birth of their last foal. In these cases I have counted the date of last abortion as last date of breeding, as the fact that they were in foal is good evidence that the reproductive organs were still active.

Of the 1,216 mares I found that—

709 or	58.3%	were breeding at the age of ..	18
648 or	53.05%	,, ,, ,, ,, ,, ,, ..	19
548 or	45.07%	,, ,, ,, ,, ,, ,, ..	20
457 or	37.58%	,, ,, ,, ,, ,, ,, ..	21
333 or	27.38%	,, ,, ,, ,, ,, ,, ..	22
248 or	19.01%	,, ,, ,, ,, ,, ,, ..	23
146 or	12.01%	,, ,, ,, ,, ,, ,, ..	24
85 or	7.00%	,, ,, ,, ,, ,, ,, ..	25
37 or	3.06%	,, ,, ,, ,, ,, ,, ..	26
17 or	1.43%	,, ,, ,, ,, ,, ,, ..	27
7 or	.61%	,, ,, ,, ,, ,, ,, ..	28
4 or	.27%	,, ,, ,, ,, ,, ,, ..	29
2 or	.11%	,, ,, ,, ,, ,, ,, ..	30

and 1 is shown as having produced a foal when 33 years old.

As far as one can judge from the above figures, it appears probable that in actual practice the mare continues to be capable of breeding so long as she lives; the fact that many even of the mares that had foals at 25 years or over are recorded as having been covered or dying one or two years after their last foaling, suggests that in the majority of cases the mare does not live to an age at which she becomes incapable of breeding; this is no doubt due to the fact that the length of life of the horse largely depends on the condition of the teeth, and these usually become useless before the ovaries cease to function: hence it is practically impossible to fix any definite period at which the mare reaches her climacteric.

Seeing the great age attained by a very large percentage of these mares, it is interesting to note that the 80 stallions whose death is recorded in the obituary list in Vol. I, General Stud Book, died at an average of 22.7 years.

THE ACTIVE IMMUNISATION OF HORSES AGAINST TETANUS.

By J. B. BUXTON, F.R.C.V.S., D.V.H.
(*Veterinary Superintendent, The Wellcome Physiological Research Laboratories, Herne Hill, London*).

THE clinical value of protective injections of tetanus antitoxin in horses and other animals is well known and has been definitely established as a result of prolonged usage.

It is also well known that the *passive* immunity which is conferred upon man or animals by such means is necessarily of a transitory nature. While the elimination of the antitoxin in man is, because it contains heterologous or "foreign" proteins, naturally more rapid than is the elimination of the homologous serum from horses, it is, nevertheless, certain that after the lapse of a few weeks the amount of antitoxin remaining in the system of the horse is probably never sufficiently high to protect the animal against a fatal intoxication.

It has long been known that more or less balanced mixtures of diphtheria toxin and antitoxin stimulate the body cells to produce their own antitoxin, and that the *active* immunity so produced persists for a very much longer time than does the *passive* immunity conferred by an injection of antitoxin alone. As long ago as 1907 Theobald Smith (*Journal Med. Research*, 1907, XVI, 359) suggested the possibility of protecting man against diphtheria by means of such mixtures, and subsequently showed that such an immunity could be produced in experimental animals. The mechanism of this reaction was ascribed by Behring (*Deutsch. Med. Wochenschr.*, 1913, XXXIX, 873) to the instability of the union of toxin and antitoxin, so that after the injection of such a neutral mixture into animals a certain amount of toxin becomes liberated and stimulates the body cells, which produce their own antitoxin. It is not finally decided whether this is so, or whether the action of antitoxin upon toxin is such as to render it incapable of producing its specific poisoning, while interfering to only a slight extent with the power of the toxin to cause the production of antitoxin in the animal; that is, converts it into a modified toxin which has lost its pathogenic but not its antigenic properties.

In the process of the active immunisation of many horses against tetanus toxin in the preparation of tetanus antitoxin during the war he found that the injection of such neutral mixtures of tetanus toxin and antitoxin in non-immune horses produced a valuable *active* immunity.

A short experiment was therefore carried out by Dr. R. A. O'Brien, Mr. Glenny and myself, and it was found that several horses which had been so treated with neutral mixtures of tetanus toxin and antitoxin withstood after an interval of a few weeks an intramuscular injection consisting of sterile garden soil, together with 2 cc. of an actively growing culture of the tetanus bacillus, representing many fatal doses.

The possibilities of this method of inducing an active and lasting immunity against tetanus will undoubtedly appeal to practitioners, more particularly to those who have experienced cases of so-called "delayed" tetanus.

The suggestion arises that mixtures of tetanus toxin and antitoxin would similarly cause the production of active, and therefore lasting, immunity against tetanus; my colleague, Mr. Glenny, has found that this expectation is justified by experiment.

THE COW, THE RINGWORM, AND THE PRETTY PARLOURMAID.

By ALFRED EDDOWES, M.D., 28, Wimpole Street, W.

I.

THIRTY years ago, when I was practising in the country, a young woman consulted me one evening for what was obviously ringworm on her cheek. A number of questions were put to her as to how she had caught it. She was a parlourmaid and "had nothing to do with children, ponies, cats or calves." I begged her to look round on going home and send me word if she noticed anyone else with anything like it. Next morning a man stepped into my consulting room. Seeing a ringworm on the centre of his forehead I merely asked his name and told him I could guess all the rest. "He was cowman to

Mr. C. of S—— Park ; that he had not been at the job long—was, in fact, quite a novice—otherwise he would have had a cap ready to wear while milking. Further, that he was in love with the pretty parlourmaid," and no wonder! "Doctor, you know too much, but it's all true," was his reply, and I almost fancied myself a Sherlock Holmes ! !

II.

RINGWORM FROM HEDGEHOG.

In this case a young lady had ringworm on the front of her wrist and on her chin, the position suggesting the caressing of a pet. The pet turned out to be a little wild hedgehog, on and in the abdominal prickles of which I found ringworm fungus. This case has already been reported in medical journals.*

BLEEDING IN A COW.

By G. MAYALL, M.R.C.V.S.,
Bolton.

Called on June 6 to a black and white horned cow, 5 years old, messenger saying she was bleeding badly at the back. Took liquor ferri. perchlor. fort, artery forceps, chloroform (Wellcomes) and two clean linen cloths. On arrival found the shippon floor streaming with arterial blood, which was coming in jets from the vulva. On opening and stretching the lips of the vulva, and looking inside the vagina, could see an artery spurting in lively fashion, and on exploration found a punctured wound commencing three inches inside the vagina, extending two or three inches deep, and evidently severing an artery on the right side of the passage. All attempts to secure the artery with a forceps failed, and the difficulty was rendered more pronounced by the restiveness of the cow, which kept kicking and side-stepping, and was little better with a figure of eight rope round the hocks. Finally I decided to chloroform her, which I did with a piece of tow soaked in chloroform and put inside an old piece of rug and held to the nostrils, the rug round the head. The cow went down in about five minutes, with about 1½ ounces of chloroform, and I proceeded to again try to get the forceps on the artery, but failed to check the flow by this means. I then fell back on the linen cloths, and two I got from the owner, besides the two I had. I rammed all four well into the vagina, so that it was filled up with them, and the end of the last cloth I soaked in liquor ferri perchlor., so that it would come in exact

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**Translated Derm. Soc. of Great Britain and Ireland,* Vol. iv., 1897, p. 32 Illustrated).

contact with the wound and the bleeding artery. In this way, after exerting pressure with my thumb and putting in pieces of tow soaked in liquor ferri perchlor., I eventually stopped the bleeding, and leaving instructions with the owner as to how to proceed in the event of recurrence of the hæmorrhage, I came away, after having spent quite an hour and three-quarters on the job. The cow came round nicely from the chloroform, which was of course not pressed, and next morning, on calling and removing the cloths and dressing the passage with zinc ointment, we let her out, and she grazed as if nothing had happened, although she must have lost nearly a stable bucketful of arterial blood. I also gave her four doses of liquor ferri perchlor. internally.

It was a mystery how the wound occurred. The owner thought it was possibly due to being horned, but this was by no means certain. Curiously enough, hæmorrhage in the cow, of which I have had two serious cases, both due to punctured wounds, has caused me great trouble to check. My first case was eventually stopped by the application of a red-hot kitchen poker.

ON A FURTHER OCCURRENCE OF THE LANCEOLATE FLUKE (*DICROCŒLIUM DENDRITICUM* RUD) IN THE LIVER OF A BRITISH SHEEP.

By E. M. LIND HENDRICKS, B.Sc., and A. W. NOEL PILLERS, F.R.C.V.S.,
Liverpool.

In The Veterinary Journal for December, 1919 (New Series, Vol. 26, p. 206) one of us (A. W. N. P.) recorded finding for the first time in his experience the lanceolate fluke (*Dicrocœlium dendriticum* = *D. lanceolatum* Mehlis) in the liver of a Scotch lamb. The parasite was unaccompanied by the common liver fluke (*Fasciola hepatica*). In the present case a liver showing the typical lesions of fluke disease was obtained from the local abattoir for museum purposes. On being dissected by E. M. L. H. it was found, in addition to harbouring *F. hepatica* to be very heavily infested with *D. dendriticum*. The worms were identical in structure to that figured in the previous record. No very exact count can be given of the number of this species present in the liver, but as it was from an adult sheep an estimate was made from a given quantity of tissue. In this way it may be stated that there were well over 2,000 specimens in the whole organ. Some delay elapsed between the dissection of the liver and getting into communication with the man who supplied it, and in the end all attempts to trace the exact origin of the host failed. In all probability it was a Scotch animal. No further case has apparently come through the same channels to the same butcher. This fluke appears to be very rare in these Islands. No reference was made to it in articles dealing with the disease when it was so widespread in Wales at the end of 1920 and early this year. There is, however, apparently some area where an animal can become heavily infected, and under suitable conditions of moisture, and with the presence of the intermediate host, such an animal would spread the infection.

A SUCCESSFUL SEQUEL TO PERSISTENT "TAPPING" IN ASCITES.

BY E. H. STENT, M.R.C.V.S.,
Manchester.

THE following are the particulars of a case of a fox-terrier bitch (now ten years old) which was exhibited before a meeting of the Lancashire Veterinary Medical Association at Manchester on December 11, 1919. The case was one of Ascites, which I tapped on the following dates taking from 3 to 4 quarts of fluid on each occasion :—December 12, 1919; January 6, 1920; March 25, 1920; April 16, 1920; June 12, 1920; August 14, 1920; October 8, 1920; November 30, 1920; December 23, 1920; and February 10, 1921. After this date the filling entirely ceased, and she is, up to date, very fit and well, and as active as a young dog. After the first six months I gave up medicinal treatment other than 31 of Epsom salts once a week and cod liver oil and emulsion once daily.

HAEMOPHILIA.

BY E. H. STENT, M.R.C.V.S.,
Manchester.

ONE frequently meets with this condition to some extent after extracting teeth of dogs, but this case was one of an Irish terrier, ten months old with perfect teeth and gums.

It was brought to me and described as having vomited blood, but after observation it was found that the blood was coming from the gums around some of the molars, and from the back of the upper incisors. Astringent lotions were tried and adrenalin injected. This acted for a time only, and tamiform was packed between the teeth and gums, but without permanent result. The dog died on the third day from loss of blood. This condition I have since learnt is supposed to be due to a lack of calcium in the blood, so obviously liquor calcio if it had been given at first might have been of benefit.

Abstracts.

THE VACCINATION OF CATTLE AGAINST TUBERCULOSIS.[*]

By Professor A. Calmette
(*Sub-Director of the Pasteur Institute, Paris*) ;
Author of "The Bacillary Infection and Tuberculosis in Man and Animals."

The great sensibility of cattle to infection by the Koch bacillus of bovine origin is a very favourable medium for the experimental study of the various processes of active immunisation against tuberculosis. One must, indeed, admit that this sensibility to infection by the bovine bacillus is at least equal to that of man by the bacillus of human origin, inasmuch as the greater number of animals submitted to permanent domicile in an infected area react positively to tuberculin in the first five years of their existence. If some amongst them escape infection, it is because the duration of their life is greatly shortened for economic reasons. Were they permitted to grow old, all of them would show tuberculous lesions at the time of their natural death. It is, therefore, very interesting to try to discover whether it is possible, by utilising the young cattle, to confer on these animals a sufficient resistance to the natural infection so that they can, whilst continuing to live in close cohabitation with the adult tuberculous cows, escape the contamination spontaneously produced in the infected stables.

The numerous experiments which have been made during the last twenty years by various investigators have not produced satisfactory results. One remembers Behring's experiments with his method of "Jennerisation," which consisted in inoculating young calves twice by the intravenous channel, at a three months' interval, the first inoculation with four milligrammes and the second with twenty milligrammes (dry weight), with a culture of human bacilli. The animals thus treated are found to have only a few months' resistance to the infection by prolonged cohabitation with cattle having open tuberculous lesions, and a fact still more serious is that for a long time they eliminate in an intermittent manner, through their dejections, and especially by their mammary glands during periods of lactation, tubercle bacilli which keep the form of the human type and would seem to offer very great dangers to man. Other experiments carried out by R. Koch and Schulze with their "Tauruman" (bovine bacilli of enfeebled virulence), and then by S. Arloing with a human bacillus in homogeneous culture, gave the same results.

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[*] We are indebted to Dr. D. Barty King for the English translation of Professor Calmette's article, which was sent to us in French.—Editor, *B. J. T.*

This important article is abstracted from the British Journal of Tuberculosis by kind permission of the Editor, Dr. T. N. Kelmack, M.D.)

A number of experiments which I made in collaboration with C. Guérin showed me that to obtain the immunity of the organism to bacillary infections, such as are spontaneously manifested in young people who have been healed of a benign tuberculous infection, it is necessary for this organism to remain parasitised by bacilli, but that these bacilli should not produce follicular lesions or tend to the formation of tubercles.

Thanks to an artificial culture, which consists in growing the bovine bacillus in a number of series of successive generations on a food medium of boiled potatoes in glycerinated bile of beef at 5 per cent., we have arrived at creating a culture of bacilli of very feeble virulence for small laboratory animals, perfectly tolerant to high doses by intravenous injection, and incapable of producing tubercles. It is this biliary (or biled) bacillus, non-tuberculined and lowered to a dose of several milligrammes for the rabbit, guinea-pig, monkey, and man, that we actually utilise for our experiments in the vaccination of young calves.

During the first days after birth, we inject by the venous channel at least twenty milligrammes of a living culture of our bacilli, and leave the young cattle thus treated in intimate contact in the stable with cows suffering from open tuberculous lesions. Up to the present, the conclusions which we have arrived at show, first of all, that the biliary (biled) bacilli are well tolerated by the lymphatic organs, that they produce no follicular lesions, and that they determine a manifest resistance, not only to the natural infections by cohabitation, but even to the infections provoked by intravenous experimental inoculation of tested virulent bacilli.

We have not yet come to a decision as to the duration of the resistance; it hardly seems to extend to over a year, and it only persists as long as biliary (biled) bacilli remain in the organism. When these bacilli have disappeared, when they have been eliminated by the natural channels of excretion of the cellular wastes—principally by the bile and the intestines—these animals become again sensible to tuberculous infection, but then vaccination can be renewed without harm. We have repeated it as often as three times in the same animal in three years, and then the resistance of the natural infection has been maintained for an equal lapse of time.

The pursuit of these experiments in the normal condition of the life of the cattle in the stable will show that it is possible to count on this method of vaccination to prevent the animal from contracting tuberculosis in an infected area. For here is the goal that must be attained. If one reaches it by utilising, as we do, a bacillus non-tuberculined, innocuous at the same time to both cattle and man, one could hope that an analogous procedure would permit of realising the immunisation of young children, directly after their birth, in such a manner that they could resist the family contamination for the whole period of their existence during which they are more particularly exposed to serious infections which are so often fatal.

Only an experiment on young anthropoid apes, in a region free of tuberculosis—for instance, in a locality on the West Coast of Africa, which is the native habitation of the chimpanzee—can give us the opportunity of verifying this hypothesis. It is therefore urgent to undertake it, and this is what we propose doing as soon as it is possible to gather together the necessary means.

ASPERGILLOSIS OF THE FOWL.

By H. H. CURSON, M.R.C.V.S.
(*Veterinary Research Officer, Grahamstown.*)

INTRODUCTION.

The above disease appears to be widely distributed throughout the Eastern Province, and is quite probably enzootic in other parts of the country. As none of the available South African literature contains any reference to the malady, it seems necessary to draw the attention of poultry farmers and others to the serious losses it may cause, and a short, plain account of the symptoms and other more important details should be of some service to those interested. Walker,* formerly of the Veterinary Research Laboratories, Pretoria, investigated a similar complaint of ostriches commonly known as chick fever or yellow liver, but unfortunately the results of his researches are too little known. and there are hundreds of farmers to-day who still speak of chick fever and are unaware of its cause and nature. In Europe, aspergillosis was first recognised over a century ago, and has been stated to affect domestic animals and even man, in addition to all classes of birds.

DEFINITION.

Aspergillosis, also termed pneumomycosis, is a disease due to the presence and multiplication of a fungus or mould, *Aspergillus fumigatus*, in the respiratory system. It is characterised by the presence of exudates and formation of nodules, generally in the gullet or lungs, but lesions may occur in other parts of the body such as the eyes, windpipe, liver, or bones.

CAUSE.

The *actual* cause, as stated in the previous paragraph, is a fungus. When infection takes place, either by ingestion or inhalation, but probably chiefly the latter, the spores under favourable conditions, including those of warmth and moisture, germinate, leading to the formation of a mass of interlacing and colourless branched filaments somewhat resembling fine cotton wool or cobwebs. From this loosely woven structure certain fertile filaments or hyphæ give rise to spore-bearing branches or sporophores, and these again produce short stalks from which are abstracted chains of bluish-green round spores of microscopic size. The fine spores, quite invisible to the naked eye, occur in the air, and germinate when they find suitable conditions.

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* Walker, J., Third and Fourth Reports of the Director of Veterinary Research, 1915, page 535.

The fungus is ubiquitous, being found along with other moulds in the soil, and particularly on damp and decaying vegetation. That aspergillus is responsible for disease is determined by microscopic examination of the nodules and other lesions, but the conditions which lead to the free living fungus becoming virulent, and thus disease-producing, are not well understood. In some cases there would appear to be some association with weather or seasonal changes; in other instances, for example, where infection has broken out in a run of birds low in condition, it is surmised that the debility has been favourable for the germination of the spores, which otherwise would not have developed in healthy poultry.

The *predisposing* causes are those which reduce the vitality and so render the bird more susceptible to the development and multiplication of spores should these be inhaled or taken in with the food. Such influencing factors are :—(*a*) Internal parasites, including tape worms, round worms, and coccidia; (*b*) infestation with external parasites, *e.g.*, fowl ticks, lice, fleas, and mange mites; (*c*) extremes of climate, such as severe droughts or prolonged rains; (*d*) unhygienic surroundings; and (*e*) insufficient and unsuitable food.

SYMPTOMS.

These depend on the course and extent of the disease and the age and stamina of the fowl. The malady may be either *acute* or *chronic*, the former condition being generally found in chicks, whereas older birds more often suffer from the chronic form.

In *acute* cases—that is when the disease appears as an epizootic and is responsible for a large number of birds being affected within a short space of time—the period of visible illness may only be twenty-four to forty-eight hours, but it is usually longer, varying from three to five days. In a few cases death may not occur for a week. The first indication of something amiss is generally the fact that a few chicks have died suddenly and, on examining the remainder, some may be found to have a watery discharge from the eyes and their general behaviour is far from normal. The combs become purplish-blue in colour and there is a loss of appetite, disinclination to run about, the head is rested close to body, the eyes are half closed, and within the lower lip is present a sticky cellular exudate. The attitude is one of dulness and depression. Later, the breathing is hurried, the mouth is frequently opened and a painful gasping sound is uttered. Thirst is acute at this stage owing to the elevation of temperature and the head is frequently shaken. As weakness becomes more marked the wings droop, the feathers do not lie uniformly, and at length from sheer exhaustion the bird falls to the ground. Following on the continued interference with respiration, sufficient oxygen is not obtained, and death results from asphyxia.

The *chronic* type of aspergillosis may occur as a sequel to an epizootic or exist as an independent affection in adult fowls owing to the greater resistance of mature birds. The train of symptoms described above may be observed, but the course of the malady is less rapid, allowing time for lesions to be developed in the upper air passages. Pale-yellow cheesy nodules, varying in size to a lentil, sometimes are to be found at the back of the throat, or otherwise the material present is a dirty fibrinous exudate, the removal of which often leaves a relatively deep ulcer. In many cases no lesions appear at all in the mouth or throat, and one's suspicions are aroused by the loss of condition, which, in spite of good feeding, is followed by intense emaciation. There may be a rattling during respiration as a result of mucous material being present in the nostrils or throat. Thirst is not so marked as in the acute form and appetite may be diminished. Sooner or later a relapse occurs, and if death does not supervene as a result of the debility it surely follows an attack of respiratory trouble as seen in the acute type. Birds that recover, or in which the disease lies dormant, often have a peculiar expression of the eyes, should these have been the seat of a discharge. The eyes are bright and sight is unimpaired, but blinking is frequent and the eyelids do not open to the full extent. Lesions involving other parts, *e.g.*, bones, would naturally lead to lameness or difficulty in walking. and in cases of liver infection there would be jaundice and digestive derangement.

POST-MORTEM APPEARANCES.

In *acute* cases there is very little to be observed. The eyes may show either a watery discharge or an accumulation of catarrhal material heaped up within the lower eyelid, giving the eyeball a distended appearance. In cases of longer duration yellow cheese-like nodules or fibrinous material may be seen in the throat, windpipe, or gullet, and if this material be removed the tissue underneath will be seen to be ulcerated. There is generally marked congestion of the lungs and liver and the heart is flaccid and dilated. The comb is generally purplish-blue, as mentioned above.

The *chronic* form of the disease is characterised by marked emaciation and the presence of nodules in the lungs. The nodules are pale yellow, circumscribed, firm, and vary in size from a pin's head to a lentil. Such lesions may also be seen in the liver, which itself is generally in a state of fatty degeneration, being paler and more friable than normal.

DIFFERENTIAL DIAGNOSIS.

As many epizootics arise in more or less the same manner, *e.g.*, several birds are suddenly noticed dead and others ill, showing signs only of listlessness, discoloured combs, and refusal to eat or move about, an endeavour will be made to indicate—*apart from microscopic examination*—the chief differences between aspergillosis and other common fatal diseases.

Avian Diphtheria or Roup.—This disease is the one most easily and most frequently confused with aspergillosis, and, indeed, it is often difficult to distinguish clinically between them. Both also may occur at the same time of the year, usually the winter and spring, and in both may be present the fibrinous exudates and cheese-like nodules. In roup, however,(*a*) the history shows some intercommunication with diseased birds, in other words, the infection is usually introduced by a recent arrival, an exhibit at a show, or infected crates. (*b*) The lesions of the mouth and throat appear to form more quickly, and when the diphtheritic layer is removed the underlying tissues do not show the same degree of injury, and the abrasion, which may be absent, is more or less superficial. (*c*) The discharges are more profuse and catarrhal and have a fœtid odour which is apparently characteristic. (*d*) The disease is less virulent and more usually runs a subacute course. (*e*) General preventive measures are usually attended with success, there being an abatement of the mortality after reasonable precautions have been exercised; and (*f*) finally, diarrhœa is not uncommon owing to catarrh of the alimentary tract.

Epithelioma Contagiosa or Chicken-pox.—Although some recent European investigations tend to show that chicken-pox and roup are due to the same causal organism, yet as the prevalence and clinical appearances of these diseases in South Arfica are usually different they will be treated separately. Chicken-pox is (*a*) relatively a mild affection, the mortality when care is taken not exceeding 10 per cent.; (*b*) it is generally prevalent at the end of summer or autumn; and (*c*) it is rarely that complications such as the presence of diphtheritic layers or discharges (watery or catarrhal) are observed.

Tuberculosis may show similar symptoms to those seen in the chronic type of aspergillosis, but it is generally (*a*) more insidious and (*b*) accompanied by diarrhœa. One is seldom likely to confuse acute aspergillosis, the more common form of the disease, with tuberculosis.

It must be pointed out that the possibility of aspergillosis and one or other of the above diseases coexisting on the same premises must always be taken into consideration, and it is that fact that renders diagnosis so difficult and unsatisfactory. However, by laboratory methods, such as microscopic examination of lesions, animal inoculation, and cultural tests, it is possible to arrive at a definite diagnosis, without which a poultry breeder is discouraged by the fact that he cannot adopt proper precautionary measures.

CURATIVE TREATMENT.

In *acute* cases this is useless. No time should be wasted on attempting to cure hopeless cases, as all one's energies should be devoted to precautionary measures. In *chronic* cases medicinal treatment is generally a failure, but if the birds are well bred, and therefore of some value, the following routine measures are advised :—

(*a*) Segregate sick birds, not only for the sake of convenience, but also because the discharges of diseased fowls are laden with aspergillus spores, probably in a highly virulent state.

(*b*) Attend to each bird individually, and alleviate the most distressing symptoms. The mouth should be opened wide and the cheesy material, if present, should be removed and the abrasions beneath touched with a stick of silver nitrate. The eyes are to be washed with a 1 per cent. solution of potassium permanganate after clearing away the discharge with a piece of cotton wool. It is important to remember that cotton wool and pieces of cloth containing discharges are to be collected and burnt. This procedure should be undertaken twice daily, and it will be found more expeditious if the head is dipped into a basin containing the potassium permanganate solution instead of bathing each eye separately.

A tonic should next be given. There are many excellent mixtures, but a medicine which not only increases the appetite (and thus directly brings about stimulation of the various functions) but which at the same time has a direct action on the chief functional regions is desired. *Nux vomica* is such an agent, for it stimulates the heart action, respiration, appetite, digestion, and intestinal peristalsis. For an adult fowl (large breed) 10-grain doses may be given daily for seven days. The following week 5-grain doses daily of quinine should be substituted in order to prevent strychnine poisoning, and so on alternately. If there is constipation give one tea-spoonful castor oil fasting, and diarrhœa may be checked with five drops of chlorodyne in half a teaspoonful of water.

Drugs are best administered to fowls in capsule form, or failing that by means of pills, which can be made up with dough.

(*c*) Accompanying above steps it is essential to give the poultry an easily digestible and nutritious diet, *e.g.*, linseed jelly, clotted milk, minced meat, or fish meal. It is, of course, important that only clean water should be used, and this must be changed twice daily. Sufficient light and ventilation are similarly essential.

In commencing the description of treatment advised in chronic aspergillosis it was mentioned that sick birds should be segregated. The course of action for remainder of birds is now to be considered. This will be referred to in the next paragraph.

PREVENTIVE TREATMENT.

Birds kept in confinement, *e.g.*, in runs in town, usually become infected from mouldy food or litter brought to the premises, whereas on farms the infection appears to originate on the land on which the birds are running, *e.g.*, lucerne paddocks. Such paddocks are generally irrigable and contain much humus in the soil, and it will be at once realised that such factors are favourable for the development of fungi.

When running space is limited all that can be done is to disinfect the run and fowl-house as thoroughly as possible.

Hycol, 1-1000 solution, is stated to give good results. The woodwork, floor—in fact, all the fittings—should if possible be scrubbed with soda and boiling water.

Disinfection on farms is for obvious reasons impracticable unless the actual source of the infection can be traced. It is, therefore, recommended that all birds apparently healthy should be taken on virgin ground—the higher the situation the better on account of drainage—and if there is no shade, shelters of corrugated iron should be erected.

It will naturally be understood that all carcases are to be disposed of by deep burial or incineration—preferably the latter.

It is convenient at this stage to make reference to the condition known as " dead in shell." This was shown by Walker* to be due in many cases to aspergillus infection contracted in the incubator-room. Here only preventive measures are of service, and unless eggs and incubators are kept from the spores of fungi, hatching results will always be unsuccessful.

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* J. Walker, *loc. cit.* 1.

The problem as to the preservation of incubator-rooms from fungi is an exceedingly difficult one, and is a question which demands more attention.

There is no doubt that our knowledge of fowl diseases in general is extremely limited, and if by the perusal of this article this fact has been emphasised it will be felt that a useful purpose has been served.—*Journal of the Department of Agriculture, September,* 1921.

Reviews.

THE CATTLE CENSUS REPORT OF THE PRESIDENCY OF BENGAL, 1920.

To the Report of the Cattle Census of the Presidency of Bengal, which was taken between January 6 and 13, 1920, is attached a large number of appendices containing a mass of figures. Regarding these the Director of Agriculture, Bengal, notes that "No claim for exactness can be set up for these figures, but on the whole they can be accepted as fairly correct. It is hoped that when the principles on which the enumeration should be made are better understood more accurate results will be secured."

Everyone who has had any practical experience of the difficulties which always spring up whenever any attempt is made to accurately enumerate anything in India, will sympathise with the Director of Agriculture. In Bengal where the agriculturists are almost entirely Hindus, these difficulties would be greatly accentuated when the counting of the cattle was undertaken. No one without Indian experience can appreciate the exasperating strain which any attempt at accuracy in taking a cattle census amongst these people entails on the European mind. To accept the figures as even "fairly accurate" requires more reliance on the work of the Bengal Panchayats than usually remains to those who have experienced the working of these Councils, even when this is carried out under the general supervision of the already over-worked district officers.

This is the second census of its kind, the first being taken in 1912, and during the period which has elapsed between the two censuses, although famine conditions and floods, droughts and cyclones have appeared in parts of the province, there has been no marked scarcity of fodder for the stock. It is stated that "outbreaks of cattle diseases were, as usual, very common during these years, but they appeared to be most severe in 1917-18. In that year rinderpest in a somewhat virulent form appeared in several districts, and especially in 24-Parganas, Noakhali, Rangpur and Bakarganj."

The chief points brought out by the statistics are :—

(*a*) The increase in the number of Brahmani bulls which is 19.12 per cent. over that of the 1912 census. A Hindu receives considerable religious credit by letting loose a young bull, but it has frequently been reported that latterly the animals selected for this purpose are as often as not poor specimens of their breed. These Brahmani bulls wander over the country living at the expense of the inhabitants, especially the farmers and shopkeepers, who often suffer very severely from their depredations. When the country was more sparsely populated, and these bulls were more carefully selected, there is no doubt they went far to supply the necessary males required for the large number of cows; but latterly with an increased population and more intensive cultivation it is doubtful whether these Brahmani bulls are not in reality a source of loss to the population. There can be no doubt but that they contribute a very decided restraining factor to any steps which may from time to time be taken to improve the breed of the cattle in a district, and their unrestrained movement over the country gives rise to a serious menace of spreading contagious disease.

The Brahmani bull is not by any means an unmixed blessing, and we greatly doubt whether the increase in the number of these animals during the eight years which intervened between the two cattle census has made for the progress of the cattle industry in Bengal. Every enthusiastic gardener in India must have experienced the destruction of many weeks of work owing to one of these bulls gaining access to his compound, and will consequently not welcome any increase in their number.

(*b*) An increase in the plough cattle of 4 per cent. If it is an actual increase and not merely due to more conscientious reporting, this is a step in the right direction. The plough cattle, which in addition to cultivating the fields also work at the wells, are the mainstay of Indian farming. It has been truly said that they carry the agriculture of the country on their backs. It will be a very long time before the tractor will be in general use on the plains of India, where, as a rule, the holdings are small and irrigation is absolutely essential to the raising of certain crops, consequently any increase in the *plough cattle* is a distinct advance, and incidentally accentuates the demand for an up-to-date efficient Veterinary Service. The plough bullock is usually of the same breed as the milch cow, and the male buffaloes used for ploughing are also the same as the milch buffaloes, being the inferior males which are not selected for breeding.

(*c*) The increase in the number of milch cows 13.44 per cent. points to an increase in the prosperity of the villagers.

(*d*) The serious fall in young stock of 24.23 per cent. since 1912 would be very serious if it could be accepted as a correct statement of existing conditions. It is explained in the report that owing to a misunderstanding in the 1912 census young stock between two and three years of age were in that year included under the heading of calves, whereas in 1920 they were returned as adult cattle. This and other unexplained causes, with probably the already alluded to difficulty of obtaining accurate returns in a census of this nature, under existing conditions, may be taken to discount any serious fall in the number of young animals. The fact that the number of milch cattle has markedly increased discounts any reference to the straitened circumstances of the people being an explanation of the reported reduction in the number of their young cattle.

The statement that the number of imported cattle has fallen can hardly be relied upon, as information regarding the breeding of cattle is often most unreliable and difficult to obtain.

It is stated in the report that "The total number of cattle is now returned at 24,724,234, showing a general decline of 2.56 per cent. over the figure of 1912. The decrease on the whole is variously ascribed to the deterioration of the condition of the cultivators during the past few years, due to high economic strain, to the want of suitable breeding bulls, to lack of grazing grounds, and to the general neglect of the people to devote reasonable care to the management of their cattle. Grazing areas are few, and such as exist are likely to decrease in area in the future. The importance of fodder crops is therefore becoming more and more evident, and their extended cultivation is urgently required." In reading this we must not forget that the report is produced by the Agricultural Department who are never slow in pressing on the public the importance of the cultivation of crops which they consider is peculiarly their own province. The figures given in this census of the total number of each class of animal are so enormous when we remember that we are dealing with only the Presidency of Bengal, a comparative small area of India, that we given them in detail :—

Brahmani bulls	31,141
Other bulls. Indigenous	1,074,768
,, ,, Imported from outside the province	18,695
Bullocks. Indigenous	7,788,787
Imported from outside the province	440,963
Cows. Indigenous	8,022,741
,, Imported from outside the province ..	95,494
Young stock (cattle)	6,225,844

Male buffaloes	639,143
Female buffaloes	260,084
Young stock (buffaloes)	126,574
Sheep	502,867
Goats	3,893,199
Horses and ponies	123,910
Mules	882
Donkeys	1,154
Camels	148
Grand total	29,246,394

If a liberally treated efficient Veterinary Service is required in any part of our Oversea Dominions it is India, and especially the Presidency of Bengal, which stands out as having the greatest claim. Here there is a great wealth of cattle providing a means for carrying on an intensive cultivation which enables a teeming population to exist on probably one of the closest populated areas of our Empire. Without its cattle this great population would starve, and the one official who can keep these animals free from devastating disease is the Veterinary officer. L. J. B.

THE DISEASES OF THE GENITAL ORGANS OF DOMESTIC ANIMALS. By W. L. WILLIAMS, Professor in the New York State Veterinary College at Cornell University, with the collaboration of W. W. WILLIAMS, B.A., D.V.M.—856 pages, with 248 figures, eight of which are coloured. Published by the author at Cornell University, Ithaca, New York. Price 10 dollars.

THIS book is a real contribution to the literature and understanding of the diseases and defects of the genital organs of animals. It covers the whole field comprehensively, and, divided into three parts and twenty-six chapters, it leaves nothing of importance on the subject out of its ken. Its main parts discuss: (*a*) Diseases and Defects not attributable to Infection; (*b*) Tumors of the Genitalia; (*c*) Infections of the Genital Organs.

Professor Williams is bold enough to question the origin and spread of contagious abortion as being due to *Bangs bacillus*. Although he grants that all abortions are due to infection, he denies that such infection is specific. He states that the most serious drawback to the theory has been its failure in practical application. "It was announced 25 years ago that, since the cause of *infectious abortion* had been *proven* it could be controlled. The 25 years which have elapsed have seen no progress in the control of abortion based upon the specific theory." Whilst admiring the author's temerity, we do not think he has examined the case for the other side at all thoroughly, recently, or minutely. Two years ago the County Veterinary Inspector for Ayrshire announced that he had "inoculated 2,658 animals at 132 individual farms with anti-abortion serum. At these farms previous to inoculation 1,388 animals aborted, showing an average of 52·2 abortions. Since inoculation 72 of these farms have become immune or clear of abortion; at the remainder of the farms 130 animals or a percentage of 4·8 have aborted. The whole result is very satisfactory, especially the fact that *72 farms are now clear of the disease*." Since then many British practitioners have testified to the real value of anti-abortion inoculation. Whilst differing very acutely with Professor Williams on this point, we go the whole hog with him when he stresses the "policy of guarding sexual health in animals." Too few measures are understood or adopted in this connection over here. Dead fruits and unprofitable fruits do occasion too much material loss and disappointment, and no widespread or efficient steps are taken to check the damage and to avoid sterility and dead or worthless progeny. It is a field that opens up, at the present time, a very important and suitable domain for the expenditure of veterinary effort and advice, and indeed one of the fresh fields that, for our own benefit and that of the nations, ought to be cultivated by us for all it is worth. The illustrations in the book are very explicit; they are beautifully executed and a very strong and admirable feature; the text is clear and concise, and the whole get-up of the volume quite American in its excellence.

We wish now to comment on a few points, to mention some that are interesting to our readers, and, perhaps, to criticise one or two statements. The ease with which a mare normally foals is explained by the fact that her vagina is "capable of lateral distension to the full size of the pulvic cavity." "The sexual wanderings of domestic animals constitute an interesting chapter in the dissemination of infectious diseases."

In the chapter on "examination of the female genital organs," the author dwells on the risks of injury the examiner is liable to, and gives elaborate methods for throwing bovines, and mentions special stalls and stanchions which are impracticable in field and farm practice as they exist over here. What about chloroform? It is quite handy, and beats chloral (as advocated at page 275), especially for the busy country practitioner. The professor decries the use of soaps and disinfectants for vaginal examinations, and believes in salt solution and bland lubricants, such as olive and paraffin oils.

Not coming "in season" is a very wide and prevalent defect in this country, and on this point the author says "it is because of ill-health or some other restraining cause. The restoration of the general health, relief from distinctively genital diseases, and the surgical dislodgement of the inhibiting *corpus luteum*," are the remedies.

Excessive sexual use has a place of importance in the book. We believe it is far too common here. In Switzerland cows at pasture number about 50 to one bull, whilst in America one bull to 20 or 25 cows is suggested. The service of two or three hundred mares yearly by one stallion is too large a figure, and the professor's belief that "most males are called upon to copulate too frequently" has a real foundation in fact. In France, where they have studied zootechny far more closely and systematically than we have here, they estimate 40 to 50 mares in a season for a thoroughbred, 60 for a light horse or vanner, and 80 or 90 for a cart stallion, and P. Diffloth says "these figures cannot be exceeded without danger."

The chapter on "Coital Injuries" (pp. 205 to 227) is a very valuable one indeed. It will be almost a classic for use in law cases. Occasionally we meet with peculiar injuries to the genital organs of the female that are difficult to explain and puzzle us completely. A light may be thrown on one or two of them if we carefully read the lines on "Sodomy and Sadism."

The illustration at page 298 of the penis of a bull affected with nodular venereal disease would indirectly lead the deductor to believe that the bull may be a potential spreader of abortion notwithstanding all statements to the contrary.

An assertion by the author at page 375 is interesting: "Some outbreaks of so-called contagious abortion are entirely referable to a lessened vitality of the spermatozoa," lack of vitamines, perhaps, as a contributory cause. Proof of this statement is entirely wanting here because nobody ever examines a bull's semen.

The chief factor in the causation of *retained fœtal membranes* is "a streptococcus of the viridous group associated at times with a colon bacillus." The author does not believe that *B. abortus* produces the state.

We had hoped to hear more helpful directions as to the treatment of *necrotic vaginitis*, but the author does not aid us much, and his directions are nothing like those which some successful practitioners have adopted over here. The cases are always troublesome ones, and light is needed on their proper treatment.

In sheep the author states that nothing is so far known which can check abortion. He rightly puts stress on the mating of genitally sound animals, and believes that one ram to 26 ewes is the right figure.

The professor has done a great service to the veterinary profession in all English speaking countries. If at times some of his statements and advice seem academic and suitable only for adoption by the trained specialist, yet they are of great scientific value, and point to the heights to which even the general practitioner should strive to attain. G. M.

REPORT OF THE VETERINARY DIRECTOR-GENERAL FOR CANADA FOR THE YEARS ENDING MARCH 31, 1919, AND MARCH 31, 1920. Published by the Department of Agriculture, Canada. Price 5 cents. (Printed by Thomas Mulvey, Printer to the King's Most Excellent Majesty, Ottawa.)

THIS report, submitted by F. Torrance, B.A., D.V.Sc., deals with two years' work in Canada, is correctly written, and yet gives the reader an excellent survey of all the fine veterinary work that is being done in the Dominion under the Veterinary Director-General's mature guidance. The opening lines of the document are very happy reading: "None of the epizootic diseases which cause most anxiety to sanitary officials, such as foot-and-mouth disease, cattle plague and contagious pleura-pneumonia, have been found within our borders." Glanders, hog cholera and cattle mange have chiefly occupied the staff, and have been kept under control and progress accomplished. Glanders occurred in the Northern part of Saskatchewan and Manitoba among horses used in hauling winter supplies to and from the mines in Le Pas district. Its origin was unknown, but infection is now stamped out.

Herds of hogs increased considerably in extent, and when outbreaks of cholera occurred many animals were usually involved. Repressive measures include licensing of all persons who collect and feed garbage to hogs, use of serum, disinfection of premises, and a period of three months' quarantine during which no fresh hogs are allowed on the premises, and by these means outbreaks were promptly controlled and losses reduced to a minimum. Cattle mange, of which there were over 500 cases in the two years, is now being actively combated by compulsory dipping (each subject twice) and allocation of dipping areas, tanks, and committees.

In connection with cattle tuberculosis, the accredited herd plan is now being adopted in Canada. The tests for tuberculosis include the subcutaneous, intradermal, and ophthalmic tests, and the Director-General speaks highly of the intradermal test: "It relieves the inspector of the drudgery of prolonged observation of temperature, it economises the time of inspectors, and it is not readily interfered with by accidental or intentional influences. It can also be applied frequently to the same animal without producing immunity to tuberculin." Everyone knows that under the subcutaneous method of testing with tuberculin no veterinary surgeon is adequately paid for his work in this country, and if the intradermal method is less troublesome and more exact there is a chance of payment being adequate for the work. In some of the States of America this test has been official for some time.

Tuberculosis in swine carcases has been pretty frequent, and the Director-General says: "It could be wiped out if we had compulsory pasteurisation of milk and its by-products used in the feeding of swine."

In 1919 Canada exported over 160,000,000 lbs. of pork and over 2½ million pounds of lard. We always like this report from Canada It is a live one, and the Department of Agriculture a go-ahead one.

G. M.

R.A.V.C. OLD COMRADES' DINNER.

THE first annual reunion dinner of the R.A.V.C. Old Comrades' Association was held at the Holborn Restaurant on Monday evening, November 7, 1921. Major-General Sir Layton Blenkinsop, K.C.B., D.S.O., Director-General A.V.S., and Colonel Commandant of the Royal Army Veterinary Corps, presided. There was the usual toast list, and after the dinner an excellent programme of music and recitation was provided by a quartette from the original Lena Ashwell concert party, who toured amongst the troops in France during the war. Over 200 past and present members of the Corps sat down to the excellent dinner provided, and a very pleasant and enjoyable evening was spent.

NOTICES.

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